THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The prospect of a considerable importation of foreign Bessemer iron, alluded to some weeks ago, is now practically a fact. The poor working of furnaces, due to the scant coke supply, has resulted in a shortage of steel making pig iron, which must be made up by importations in the next four or five months, the amount required being estimated at 100,000 tons. Bessemer from English west coast can be laid down in Pittsburg at $21.50, as against $22.50 to $22.75 now paid for small lots of domestic iron. Inquiries now out for English Bessemer amount to about 50,000 tons. Canadian foundry iron is now a factor in the Central West, deliveries this year being made at $22.75 to $23 for No. 2, while a high-silicon Canadian iron has sold at $22.25 for next year. Scotch irons are coming into Central territory and are likely to be a factor for some months, as a number of foundrymen have reached the point at which foreign iron is their only salvation from a shut down. The continuance of the anthracite strike and the short coke supply, which latter furnacemen are now accepting as a condition likely to run on for some months, will increase rather than diminish the use of foreign irons. The Southern furnaces, from the present outlook, will not be able to take on the business that will be offered for the first half of next year, and their books will probably be opened in October for deliveries in the second half of 1903. In the past week the announcement that the strike in the New River, Kanawha and Pocahontas fields gave promise of improvement in the coke supply for Southern Ohio furnaces. In the Mahoning and Shenango Valleys the situation is somewhat improved, but the relief is likely to be followed by another interval of scarcity. In the East foreign irons are being more and more used and at prices below those at which domestic brands are sold deliverable next year, Scotch irons for early shipment being sold at $22.50 to $23, delivered on dock. Some good lots of German open-hearth steel have been taken at $28, delivered on Philadelphia dock, duty paid. The finished material situation presents no new factors. Plate mill capacity is increasing but orders have been booked so far ahead that there is no reduction in the premiums for delivery this year and in January and February, 1903, 1.85c Pittsburg being commonly paid. Chicago reports a rail order for 25,000 tons from the Atchison, Topeka & Santa Fe Road, and there is other inquiry pending to the amount of 70,000 tons of standard rails, while light rails have been quite active. The lighter forms of finished material, which have been lagging for some time, show improvement, but the undetermined questions growing out of the excess of capacity in these lines will ultimately appear as market factors.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Sept. 10

Indications now point to heavy purchases of foreign Bessemer iron by the large steel producers of this country during the remainder of the year. The production of Bessemer iron by the independent furnaces in the Valleys, as well as the furnaces of the United States Steel Corporation, has been greatly curtailed during the past six months, owing to the inability of securing the proper supply of coke, and now the steel plants are face to face with a shortage in the supply of their steel making iron that can only be replaced by the foreign product. One inquiry for 50,000 tons of Bessemer iron by independent interests has already been made to English furnaces and it is considered probable that the United States Steel Corporation will also place a large order abroad for iron to be delivered the remainder of the year. English Bessemer can be delivered here at $21.50, which is fully $1 less than the price for which small lots of domestic Bessemer have sold in the past two weeks. It is believed, however, that on a large tonnage the iron can be laid down here at $21 to $21.25. The only objection to English hematite is its high percentage of silicon, as the English Bessemer practice calls for a higher percentage than the practice in this country. However, the percentage of silicon can be materially reduced, as it would be to the interest of the English furnacemen to do so, enabling them to secure a larger output than when working on high silicon iron. It is also probable that considerable low phosphorus iron will be brought into this market at prices ranging from $22.75 to $23. One large independent steel producer in this district that has not yet made inquiry for foreign Bessemer, believes that a considerable tonnage must be purchased during the next two months unless shipments materially improve within 30 days.

The shipments of coke to the Valley furnaces during the past week were rather better than for some time, but despite this improvement a half dozen furnaces were compelled to bank for brief periods owing to the interruption of shipments. A number of the Valley stacks whose daily requirements amount to 200 cars, received only five one day the latter half of last week, and for several days this week the consignment did not amount to more than 50 cars. The railroads claim to be making every effort to get coke to the furnaces, and in a measure have succeeded. However, a vast improvement yet remains to be made, before the furnaces can attain their normal output.

Canadian foundry irons are now being sold in this market for delivery the remainder of this year, and we note the sale of a small lot for delivery the first half of next year. This iron is sold on guaranteed analyses, and the 500 tons sold for next year's delivery was placed at $22.25 per ton, the silicon guaranteed at from 2.75 to 3 percent. While considerable Middlesbrough foundry iron is being offered here, little is being sold.

In finished lines a little more activity is noted, especially in light sheets, wire, wire nails and cut nails. The demand for tin plate is also reported somewhat stronger and the stocks at various mills throughout the country are being depleted. The agricultural implement manufacturers are also commencing to specify on their contracts, the early specifications serving to strengthen the steel bar market considerably. Structural shapes and plates are strong at unchanged prices.

PIG IRON.—Domestic brands of foundry iron are practically unobtainable for delivery the remainder of the year and foreign brands must be depended upon almost entirely to make up this deficiency. Canadian foundry iron is being offered here in round lots for early shipment at prices ranging from $22.75 to $23, while for delivery next year we note the sale of 500 tons of high silicon iron at $22.25, delivered. English Bessemer and low phosphorus irons will be imported in large quan-

tities in the next three or four months, as all the steel producers are short owing to the falling off in the deliveries of steel making irons from the Mahoning and Shenango Valleys. It has been conservatively estimated that no less than 100,000 tons of steel making iron will be imported on new contracts before the end of the year. There is little demand for either basic or forge irons, Virginia furnaces offering large tonnages of both grades, with no takers. On Thursday the constituent companies of the United States Steel Corporation will place their monthly order of pig iron. How much will be purchased cannot be estimated at this time, as the tonnage that will be taken will be governed almost entirely by the price. We quote as follows:

Bessemer, Valley	$21 00 to 22 00
Bessemer, Pittsburg	21 75 to 22 75
No. 1 Foundry	23 25 to 23 75
No. 2 Foundry	22 25 to 23 25
No. 3 Foundry	21 75 to 22 25
Gray Forge, Pittsburg	21 50 to 21 75
Chilled Basic, Valley	20 75 to 21 00
Chilled Basic, Pittsburg	21 50 to 21 75

STEEL.—The steel market, both foreign and domestic, is very quiet, consumers not being desirous of placing orders at prevailing quotations. Domestic billets for early delivery are offered at $32 per ton in small lots, while a large order could readily be placed at $31.50. Open-hearth billets are held at about $33 per ton. German billets are now held at $29.50 to $30, and we note the sale of 500 tons at the latter price. There have been large offerings of rods during the past few days and several large contracts have been closed for future delivery at prices ranging from $35 to $35.50. For immediate shipment, small lots are held at $36.

SPELTER.—There has been practically no change in the spelter market during the week, prime western grades being held at 5.35c to 5.38½c, delivered, Pittsburg.

FERRO-MANGANESE.—Quotations on both domestic and English manganese continue only nominal at $52.50 per ton delivered at buyer's mill. German ferro is held at $51.25 to $51.50, delivered anywhere in the United States.

MUCK BAR.—The market is quiet but firm, neutral muck being quoted at $35.50 to $36 per ton.

SKELP.—Grooved iron skelp is now held at 2.10c, the market feeling the effects of the offerings of eastern mills. Sheared iron skelp is held at 2.12½c, while steel is quoted at 2.15c.

RAILS AND TRACK MATERIAL.—There have been no notable contracts for next year placed in this market during the past week. The light rail market continues strong and the demand continues to exceed the production. Quotations are unchanged as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $46; 12 pounds, $44; 16 pounds, $42; 20 pounds, $40; 25 to 40 pounds, $38 to $40. Track material: Spikes, 2c to 2.05c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

BARS.—A number of the agricultural implement manufacturers are already specifying on their steel bar contracts and the market has been correspondingly strengthened. The amount of new business, while limited to small lots, is also increasing. The bar iron market is very firm and agreement quotations are being well maintained. We make the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.90c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PLATES.—The plate market continues very strong with sales limited almost entirely to deliveries after the first of next year. On deliveries during January and February 1.85c is quoted by local mills. Agreement quotations are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

STRUCTURAL MATERIAL.—The market continues very firm and sales for early delivery are made on a basis of 2.25c to 2.50c. On contracts for delivery next year the following agreed quotations are made: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—The market continues very strong with the larger sizes of pipe in strong demand. Some competition is however met with on the smaller sizes of merchant pipe. Quotations to jobbers in carload lots, with freight added to destination, are as follows:

MERCHANT PIPE.

	Black Percent.	Galv. Percent.
⅛ to ½ and 11 to 12 inches	60	48
¾ to 12 inches	67	55

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	42½
2¼ to 5 inches	50
1¾ to 2¼ and 6 to 13 inches	40

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	63

SHEETS.—The demand for the lighter gauges of sheets has greatly increased during the past few days and the market is stronger than it has been for some time. The heavier gauges continue firm, and the demand is heavy. Quotations in small lots from jobbers are as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets, in carload lots to consumers, are quoted at 3.05c for Nos. 10 and 11, 3.45c for Nos. 18 to 21, 4.20c for No. 27, and 4.50c for No. 28. Galvanized sheets, mill shipments in carload lots to consumers are as follows: Nos. 10 and 11, 3.05c; Nos. 12 to 14, 3.15c; Nos. 15 to 17, 3.25c; Nos. 18 to 21, 3.45c; Nos. 22 to 24, 3.75c; Nos. 25 and 26, 4c; No. 27, 4.25c; No. 28, 4.50c.

WIRE AND WIRE NAILS.—Demand for cut nails is strong and nearly all the mills are behind on their orders. Large sales of wire and wire nails have been reported, jobbers buying heavily to fill up their depleted stocks. We make the following quotations: Wire nails in carload lots, $2.05 per keg; smaller lots, $2.10 and $2.15; plain wire, $2 in carload lots and $2.10 in less than carload lots to retailers; galvanized wire, $2.40 in carload lots; polished staples, $2.20, and galvanized staples, $2.60; painted barb wire, $2.60, and galvanized, $2.90. These prices are quoted on a Pittsburg base plus the actual freight to destination. Cut nails are held at $2.05 in carload lots and $2.10 in less than carload lots, Pittsburg, plus freight to destination.

MERCHANT STEEL.—A meeting of the shafting manufacturers will be held shortly for the purpose of discussing prices, but it is not probable that any changes will be made. We make the following quotations: Turned cold rolled ground shafting in carload lots, 47 off, and in less than carload lots, 42 off; tire steel, 2.25c to 2.30c; toe calk, 2.35c to 2.45c; sleigh shoes, 2.25c to 2.35c; machinery steel, 1.70c; smooth machinery steel, 1.75c. Tool steel, 7 cents and upwards.

OLD MATERIAL.—The demand for low phosphorus melting stock and heavy melting stock is much better than it has been for some time and prices are somewhat stronger. We make the following quotations, gross tons: Cast scrap, $19 to $19.50; heavy melting stock, $21.25 to $21.50; No. 1 wrought scrap, $22.25 to $22.50; steel rails for rerolling purposes, $23; car wheels, $21.25 to $21.50; borings, $10.50 to $11; turnings, 10.50 to $11; low phosphorus melting stock, $24.25 to $24.50.

COKE.—Interest continues to center in coke prices for next year's delivery, and while producers are not at all anxious to name prices they are being continually urged by consumers for quotations covering the first half of 1903. It is probable that some of the large independent producers will open their order books during the next ten days, as the furnacemen in the East are particularly anxious to close contracts for next year. Furnace coke for prompt shipment is being sold in car-

load lots at $3.50 to $3.75, while foundry coke in carload lots is being held at prices ranging from $4 to $4.50. For the week ending Saturday, August 30, the output of the upper Connellsville region reached 254,853 tons, a slight increase over the previous week, while the output of the lower region was somewhat smaller than that of the previous week. The week's production of the upper region again breaks all previous records.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Sept. 9 1

No relief has come nor is any in sight from the coke shortage, and its prolongation is causing considerable uneasiness to both furnacemen and foundrymen. Not one furnace in this section is working to its full capacity, which is also true of many in the South; and foundrymen are suffering from a curtailment of their supply of iron in addition to an insufficient supply of coke. This has compelled a number to enter the open market for spot iron, and rather than pay $27.65 a ton for iron and $10 to $11 a ton for coke, some have closed their shops. That the number will grow unless conditions change soon is certain, as not all of them can pay the present high prices. The demand for finished material continues quite active. Contracts for structural material are being placed freely, these generally covering needs for the first half of next year. Sheets do not show any pronounced sign of strength, though a considerable tonnage is being booked by all the mills. Light plates are active, and 2 cents is asked by mills in position to give prompt delivery. An Eastern concern rolling merchant steel reports that the shipments into this territory during August exceeded the tonnage of any similar month in its history. Inquiries for standard rails aggregating 70,000 are in the market, as well as a good sized tonnage for light rails. There is a good demand for bar iron of all sizes, though some uncertainty is prevalent as to price. Cast scrap finds ready sales and is stiffening in price in sympathy with pig iron, though other descriptions of old material are weak.

PIG IRON.—In view of existing conditions, it is somewhat difficult to give a correct report of this market. No two sellers agree either on prices or as to the outlook. Though the large Southern manufacturers are out of the market for the first half of next year, there are one or two furnaces still selling iron for that delivery. These have not a fixed price for their product, but are offering it at from $18.50 to $20 a ton Birmingham. Occasionally a few hundred tons is offered for prompt shipment, the price of which is $27.65 for No. 1 foundry. No Northern furnace is offering spot iron in this market, though a local stack has still some tonnage unsold for the first half of next year. The demand for spot iron has largely increased of late, owing to the fact that few furnaces, either in the North or South, have been working to their full capacity, which is a result of the coke famine. Many foundrymen are closing their shops rather than pay the high prices being asked for spot coke and iron, and unless conditions improve in the near future, the number of idle foundries will be largely augmented. There has been some buying of Northern iron in the past week for delivery in the first half, the total tonnage aggregating 6,000 to 8,000 tons, though the trading is largely in spot iron. There is a growing demand for foreign iron, and sellers are now asking $27 to $28 a ton. The following quotations which are for next year's delivery, while not asked by all the sellers that still have iron to offer, are within 50 cents of the market:

Lake Superior Charcoal	$27 00 to 28 00
Local Coke Foundry No. 1	24 00 to 25 00
Local Coke Foundry No. 2	23 75 to 24 25
Local Coke Foundry No. 3	23 25 to 23 75
Local Scotch Foundry No. 1	23 50 to 24 50
Local Scotch Foundry No. 2	23 00 to 24 00
Southern Coke No. 1	23 65 to 24 15
Southern Coke No. 2	23 15 to 23 65
Southern Coke No. 3	22 65 to 23 15
Southern Coke No. 4	22 15 to 22 65
Southern No. 1, soft	23 65 to 24 15
Southern No. 2, soft	23 15 to 23 65
Southern Gray Forge	21 15 to 21 65
Southern Silveries	24 15 to 24 65
Jackson Co. Silveries	28 00 to 29 00
Ohio Strong Softeners	25 60 to 26 10
Alabama Car Wheel	27 15 to 27 65
Malleable Bessemer	25 00 to 26 00

BARS.—New business continues to be brisk and prices are stiffening. Some mills are still asking less than 1.95c, though the majority report that this is the lowest figure at which they are taking new contracts. Specifications are coming in very freely, indicating an enormous consumption of material. We quote Chicago delivery: Bessemer steel, 1.75c to 1.85c; angles, less than 3x3, 1.85c; iron, 1.85c to 1.95c; hoops, 2.15c. Prices for prompt delivery and out of store, steel, 2c to 2.10c; iron, 2.20c to 2.25c; hoops, 2.50c to 2.60c; angles, 2.50c to 2.60c.

SHEETS.—Consumers are specifying heavily on their contracts and new business is of good proportions. The output of mills, however, is below the present consumption, and a summary of the opinions of jobbers and manufacturers indicates a falling off in demand. We quote No. 27 black, Chicago delivery, 3.15c to 3.25c; galvanized, 4.10c to 4.20c; out of store, No. 27 black, 3.20c to 3.30c; galvanized, 4.35c to 4.50c.

STRUCTURAL MATERIAL.—Consumers are placing contracts with mills through the jobbers very freely, providing for deliveries in the first half of next year. Jobbers report they could readily get ¼ of a cent per pound above present prices, but are hesitating to do so for fear of creating a false market. Stocks are being rapidly depleted, and as they cannot be replaced from mill it is probable that prices out of store will shortly advance. Specifications are being asked for a building requiring 3,000 tons of structural shapes. Mills report that beams and channels can still be had for the first half of next year; structural plates not before the last six months. We quote mill prices as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; structural angles, 3x3 to 6x6, 1.85c; angles, channels and tees smaller than 3 inches, 1.85c base; plates, 1.75c. Prices on lots from store vary from 2½ cents to 4 cents a pound.

BILLETS.—Though we know of no sales, we quote domestic open-hearth billets, $38. Foreign made billets are quoted at $31.50, based on sizes averaging 4x4.

RAILS AND TRACK SUPPLIES.—The Atchison, Topeka & Santa Fe placed a contract last week with an Eastern mill for 25,000 tons of standard sections. There are other large inquiries in the market, aggregating 70,000 tons, in addition to a number of small lots. Light rails are in active demand, as also are track supplies. We quote heavy sections, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes; out of store, $45 to $50; splice bars, 2.25c; spikes, carload lots, 2.45c to 2.55c; track bolts, 3½x¾, with square nuts, 3.05c per 100 pounds; with hexagon nuts, 3.20c, with usual differentials for other sizes.

MERCHANT STEEL.—A large manufacturer reports that shipments into this field during August exceeded the tonnage of any similar month in its history. There is very little new business placed as all the mills are sold up for several months to come. Sales of small lots from store are numerous. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.95c to 2c; open-hearth spring steel, 2.65c to 2.75c; sleigh shoe, 1.75c to 1.80c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.40c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

CAST IRON PIPE.—Business is fairly brisk, orders averaging small tonnages. Los Angeles, Cal., has asked for bids on a contract aggregating 4,500 tons of pipe of various sizes. Prices continue firm in sympathy with the pig iron market. We quote 4-inch water pipe, Chicago delivery, $36; 6-inch and larger, $35; gas pipe $1 a ton higher.

MERCHANT PIPE.—There is a fair volume of business being placed and prices are firm as given below:

MERCHANT PIPE, RANDOM LENGTHS.

(Jobbers, Chicago Basing Discounts.)

	Black Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58½	46½
¾ to 12 in. inclusive	65½	53½
(Consumers, Chicago Basing Discounts.)		
⅛ to ½ in. inclusive	56½	43½
¾ to 12 in. inclusive	63½	50½

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in	35
1¾ to 2½ in	45
2¾ to 5 in	55
6 to 13 in	47½

Iron.

	Percent.
1 to 1¼ in.	35
1¼ to 2½ in.	32½
2¼ to 5 in.	42½

PLATES.—Independent mills in position to give quick deliveries are doing an active business. For shipment this year, 2c to 2.15c a pound is asked. We quote mill prices for future shipment, Chicago delivery: Tank steel, ¼ inch and heavier, 1.75c to 2.15c; flange steel, 1.85c to 2.25c; from stock, tank steel, ¼ inch and heavier, 2.25c to 2.50c; 3-16, 2.35c to 2.60c; No. 8, 2.40c to 2.65c; flange steel, 2.50c to 2.60c.

WIRE AND WIRE NAILS.—There is no diminution in the heavy demand for all kinds of wire product. Both wholesale and retail dealers are wiring for prompt shipments, their orders generally being for larger tonnages than heretofore. We quote prices to jobbers as follows: Smooth wire, carload lots, $2.10; painted barb wire, $2.70; galvanized barb wire, $3; wire nails, $2.15; staples, $2.25. Retailers' prices are 5c higher than above.

COKE.—There is no improvement in the situation, and coke of any kind is very scarce. A number of local foundrymen have closed their shops in the past week rather than pay the present high prices. Many cannot get coke, however, at any price. Carload lots are still offered at from $8.50 to $10.50 per ton.

OLD MATERIAL.—There is a good demand for cast scrap of all kinds and prices of this material are very firm. Other grades of old material are not in such active demand, most of the mills having large stocks on hand and preferring to wait until prices go lower before buying for winter delivery. The following quotations are on gross tons:

Old Iron Rails	$24 50 to 25 00
Old Steel Rails (mixed lengths)	19 00 to 19 50
Old Steel Rails (long lengths)	23 50 to 24 00
Relaying rails	31 00 to 32 50
Old wheels	20 50 to 21 00
Heavy melting steel	17 50 to 18 00
Mixed country steel	15 50 to 16 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$21 00 to 21 50
No. 2 R. R. wrought	19 50 to 20 00
Dealers' forge	16 00 to 17 00
No. 1 busheling	15 50 to 16 00
No. 1 R. R. and Machine Cast	16 00 to 16 50
Railway malleable	16 00 to 16 50
Country malleable	15 50 to 16 00
Iron axles	24 50 to 25 00
Steel axles	21 00 to 21 50
Cast borings	10 50 to 11 00
Wrought turnings	14 50 to 15 00
Iron axle turnings	15 00 to 15 50
Steel axle turnings	14 50 to 15 00
Stove plates	12 00 to 12 50
Old iron splice bars	21 00 to 21 50

CINCINNATI.

Sept. 9

The demand for iron continues without abatement. All along the line there is the same urgent call for the filling of orders which has been noted in the recent past. While this is true, it is stated by some that the stopping of the movement of anthracite coal has made more cars available and has helped the situation to some extent. This is counteracted somewhat by the long haul of bituminous coal to the East, which requires more cars for a given tonnage. Nevertheless the supply of desirable grades of pig iron is still very short and this has its effect all the way through the trade.

PIG IRON.—Dealers report the same active demand for spot and future delivery, with continued scarcity of the desirable grades. The short fuel supply has caused furnaces to make more low grade iron than usual and for this description there is a rather easy market with prices slightly lower. Only a few small scattering lots of spot iron are offering. They have been commanding fancy prices, but there are indications that the extreme values prevailing in the last ten days are not now obtainable. This is accounted for by a belief that the car situation has been less strained recently, and that foreign iron to some extent has relieved some of the urgent needs. The foreign product has been sold slightly below the high prices asked for equivalent domestic grades of spot iron.

The coke situation is still most aggravating. The settlement of the Pocahontas coal strike has given it a more hopeful appearance but the news is not so definite from the Kanawha and New River districts. The settlement in the Pocahontas district may give some relief to the Southern Ohio furnaces by the close of the week. The volume of trade keeps right up. Contracts are mainly for delivery in the first half of 1903. Iron for the near deliveries is very hard to obtain. Dealers report no increase in the buying, but say the orders aggregate the same large tonnage. There is talk of more pronounced car shortage as soon as the equipment is needed to move the corn crops. Prices on pig iron at Cincinnati for delivery after January 1, conforming with the advance in freight rates effective Sept. 15, are as follows:

Southern Foundry No. 1	$22 75 to 23 50
Southern Foundry No. 2	22 25 to 22 75
Southern Foundry No. 3	21 25 to 22 00
Southern Foundry No. 4	20 75 to 21 50
Southern Foundry No. 1, soft	22 75 to 23 50
Southern Foundry No. 2, soft	22 25 to 22 75
Gray Forge	20 50 to 21 50
Northern Foundry No. 1	26 10 to 26 60
Northern Foundry No. 2	25 10 to 26 10
Southern C. W. iron	27 50 to 28 50
Maleable coke iron	25 00 to 25 75

FINISHED MATERIAL.—There has been no change in prices for finished material. The demand continues large for all descriptions. It is the same story of mills behind on orders and anxious customers. It is difficult to find stock stuff and when something of this character is wanted dealers are widely canvassed in search of same. While all kinds of material are wanted it is noted that structural iron has the most pronounced inquiry.

OLD MATERIAL.—The market for scrap iron has been active and under urgent demand prices have been advanced. Everything offered is eagerly taken at full prices. We quote:

Old No. 1 Wrought Railroad, net tons	$20 75 to 21 25
Cast Machine and Foundry, net tons	15 00 to 15 75
Old Iron Rails, gross tons	25 00 to 26 00
Old Steel Rails, gross tons	24 50 to 25 00
Old Short Lengths, gross tons	18 00 to 18 50
Old Iron Axles, net tons	27 00 to 28 00
Old Iron Car Wheels, gross tons	20 50 to 21 00
Stove Plate, gross tons	11 75 to 12 00
Wrought Turnings, net tons	15 25 to 15 75
Cast Borings, net tons	10 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 10.

The shipments of iron ore from the upper lake ports for August were 4,078,311 tons, which was 476,306 tons more than for August, 1901, and 4,925 tons more than for July this year, when all records were broken. The total movement for the season to Sept. 1 was 17,051,530 tons, as compared with 12,263,436 to Sept. 1, 1901. There is now little doubt that the total for the entire season this year will be close to 24,000,000 tons, in spite of the fact that the docks are badly crowded and railroads are unable to do their part with any degree of promptness.

PIG IRON.—For the first time in many years, foreign iron has been sold in Cleveland. The first sale was a carload of Eglinton (Scotch) iron to a local foundry and more sales are certain to be made. This first carload will be delivered within a few days at $25, Cleveland. A prominent Canadian company which manufactures pig iron has established an agency in this city and hopes to benefit from present unusual conditions. The pig iron situation at present is very unsatisfactory and is getting worse. Owing to the inability to get coke, furnaces cannot fill their contracts for this year and some of them are now more than two months behind in deliveries. The result is that foundries have been compelled to go into the market and buy iron at prices far in advance of the contract prices and furnace owners and agents are being bombarded with protests. Foundrymen say that they are not only losing the money which they pay for emergency iron, but are also sustaining losses of many castings because iron purchased to meet shortage does not fulfill requirements. Owing to the extreme uncertainty as to what the furnaces will be able to produce, very few sales are now being made for next year. The only good news received as to the fuel supply is the settlement of the strike of miners in the New River, Kanawha and Pocahontas districts of West Virginia. The furnaces at Struthers and Lowellville have resumed, but their supply of coke is small and there is serious doubt whether they will be able to keep going. We quote prices as follows, the figures on foundry iron being for shipment in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray forge, Valley	20 50 to 20 75
Lake Superior Charcoal	25 00 to 26 00

FINISHED MATERIAL.—The week has been rather quiet in finished material, although hardly as dull as the two preceding weeks. The expected order for plates for new ships has not yet been placed, but plans have been prepared for at least one steel freighter. While the pool price of tank steel is 1.70c and orders can be placed at that figure, provided no guaranty of delivery is given, the absence of guaranty means that delivery can not be depended upon until after the first half of next year. Hence no sales are being made at 1.70c and prices range frmo 2c to 2.25c, the larger widths commanding the higher prices, while 3c is asked for immediate delivery from stock. The base price for bar iron is 1.80c, Pittsburg. The only disquieting feature of this market is found in reports from smaller Western mills, which are said to be selling at 1.70c. Sales out of store, Cleveland, are at the rate of 2c for iron and 1.90c to 2c for steel, while large rounds bring from 2.10c to 2.25c. We quote steel bars at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. While reports come from other cities that there is an improvement in the sheet market, there has been little change here. In spite of rumors of independent mills cutting prices, there has not been real weakening of prices in this district, although the demand has been slack. There is a disposition on the part of buyers not to take freely to products of new mills, until they have demonstrated their quality. We quote 2.10c to 2.15c Cleveland for 3-16 inch sheets and heavier. Cleveland prices are on the following basis on mill sales of black sheets: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 22-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c, for one pass cold rolled. On galvanized sheets Cleveland prices to consumers are as follows for carload lots: Nos. 10 and 11, 3.15c; Nos. 12 to 14, 3.25c; Nos. 18 to 21, 3.55c; Nos. 22 to 24, 3.85c; Nos. 27 4.53c; No. 28, 4.60c. We quote 1.70c Cleveland for beams and channels for delivery in 1903, business for 1902 being through jobbers at prices from 2½ to 3½c according to sizes and quantity.

OLD MATERIAL.—There has been a fair demand for machine cast scrap, but otherwise the old material market is dull. We quote Cleveland prices, all gross tons, as follows:

Old iron rails	$25 50 to 26 50
Old steel rails (over 6 ft.)	22 00 to 23 00
Old steel rails (6 ft. and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	22 00 to 23 00
Mill scrap	19 50 to 20 50
No. 1 machine cast scrap	18 00 to 19 00
Iron axles	28 00 to 29 00
Steel axles	27 00 to 28 00
Axle turnings	18 00 to 18 50
Wrought turnings (free from cast)	15 50 to 16 00
Cast borings	11 00 to 11 50
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	11 50 to 12 00
Wrought drillings	15 00 to 16 00
Malleable iron (railroad)	20 00 to 20 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	13 00 to 14 00
Heavy steel	18 50 to 19 50

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Sept. 9,

PIG IRON.—The market, so far as domestic irons are concerned, underwent no change during the past week. In Southern irons the situation was particularly dull, chiefly because many large producers are still out of the market. Some idea of the dullness which prevails may be gained when it is stated that one of the largest Southern producers only sold 200 tons of all grades of iron during the past two weeks. Inquiries still continue to come in for Southern iron for delivery during the first six months of next year, but no transactions result from them. The fact of the matter is—and assurances given recently leave no doubt of it—the Southern furnaces have already sold nearly all of the material they are capable of producing for the first six months of next year. Some of them have iron for sale for that period, but it represents a very small tonnage, much smaller than some are inclined to believe. Advices from Birmingham received here tell of Southern No. 2 Foundry selling on the basis of $20 at the furnace. These advices strongly indicate that if the figure named is not the minimum now, not many weeks will elapse before it will be. One sales agent for a Southern interest has inquiries for some 10,000 tons of No. 2 foundry, and says he will have no difficulty in disposing of that amount at or about $20 at the furnace, but he does not believe his company will take the orders. Northern irons for 1903 delivery are in good inquiry, but the furnaces adhere to their unwillingness to take any orders. Even where there is a disposition to take business for next year's delivery, there are stipulations relative to the strike being settled and other conditions which purchasers are reluctant to accept. Sales of Northern irons for delivery next year, which represent a comparatively small tonnage, have been on the basis of $23 to $24 for No. 1 X, $22.50 to $23 for No. 2 X and $21 to $22 for No. 2 plain, at the furnaces. Consumers having this year's requirements to meet are still buying liberally of foreign irons. Middlesboro No. 3 is selling at from $20.50 to $21 for New York delivery, and while some reports quote a lower price, the location of the iron would like to be ascertained by some sales agents. The better grades of Scotch irons command from $23 to $25 for New York delivery. Complaints of belated deliveries on the part of the furnaces are frequently expressed by foundrymen, who have been seriously handicapped.

From information given the probabilities are that the Southern furnaces will open their books for the last six months of 1903 in the early part of October. During the past few days the feeling has been particularly hopeful in this vicinity that the anthracite strike is near a settlement. New York prices for this year's irons, largely nominal, are as follows: No. 1 X Northern, $23.50 to $25; No. 2 X Northern, $22.75 to $23.50; No. 2 plain Northern, $22.25 to $22.50; No. 1 foundry Southern, $22 to $23; No. 2 foundry Southern, $21.75 to $22.50; No. 3 foundry Southern, $21.50 to $22.75; No. 4 foundry Southern, $20.25 to $21.25.

FINISHED IRON AND STEEL.—Activity all along the line is the rule in the structural material market. Buying for 1903 was more in evidence during the past week than at any time heretofore, and some good sized orders were booked. The situation in plates, bars, and sheets remains unchanged. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 3.50c; refined iron bars, 1.95c to 2c; soft steel bars, 1.95c to 2.10c. Sheets in carload lots, New York, No. 28 black, 3.18c to 3.25c; galvanized, 70, 10, and 5 off.

The first annual meeting of the American Stove Co., manufacturing vapor stoves, was held in Cleveland, Sept. 9. The capital stock of the company, which was organized last January, is $5,000,000. A dividend of 5 percent was declared, $50,000 was charged off from machinery and pattern account, and $160,544.86 passed to surplus, making the surplus account $358,144.86. The following directors were elected for the ensuing year: A. E. Ambs, John Ringen, E. C. Baxter, C. I. Dangler, D. Ed. Dangler, C. A. Stockstrom, E. H. Stockstrom, Louis Stockstrom, George F. Fiske, F. L. Alcott, W. H. Boardman, George M. Clark, H. J. Trenkamp, Henry Trenkamp, Sr., O. P. Moon, Paul Schneider, Kenneth K. McLaren. The directors elected the following officers: President, C. A. Stockstrom, St. Louis; secretary, H. J. Trenkamp, Cleveland; treasurer, George F. Fiske; vice presidents, George M. Clark, F. L. Alcott, E. H. Stockstrom; general manager, Cleveland district, F. L. Alcott; master mechanic Cleveland, Paul Schneider; general sales manager, E. H. Stockstrom; assistant manager Cleveland district, O. P. Moon.

The plant of the Lorain Foundry Co., Lorain, O., was damaged by fire Sept. 8. The frame addition, 185x90 feet, was entirely destroyed and part of the roof of the main building was burned. The rest of the plant was not damaged and melting will be resumed Friday. A new building will be erected as soon as possible to take the place of the one destroyed and the plant will soon be in better condition than ever.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

SEPTEMBER 11, 1902

UNION RESTRICTION OF FOUNDRY OUTPUT.

While there have been frequent general disclaimers on the part of Iron Molders' Union officers of any attempt by the union to limit output, instances come to light in which there is at least no knowledge by local unions that such high ground has been taken by their organization. Cleveland foundrymen have had occasion recently to know that in spite of the best intentions of intelligent and fair-minded officers, local unions are yet able to enforce restrictions most arbitrary and unfair. A few months ago two brothers, both union men and first class molders, deemed it wise to invest a part of their savings in the stock of a Cleveland foundry. They have been for years in the front rank in their trade, and to their skill and industry were added the habit of saving from their earnings. The foundry in which they worked secured a large bed-plate order, and the two brothers were put on the job. Without over-exertion—indeed, at quite an easy gait, as it seemed to the management—they completed the work in 480 hours. The shop committee meantime discovered that this same job had taken at least 660 hours in other shops, and accordingly charged the two men with "killing the job." They were notified in writing and were summoned to appear at a meeting of the union to answer the accusation. At the time appointed they found that but one witness appeared against them—a man with a record as a disturber, who worked in a different shop, and who had no information whatever, evidently a figure-head for the real complainants. An adjournment was taken after the case of but one of the accused men had been considered. At the following meeting, with scarcely any discussion of the matter, one of the brothers having had no opportunity to speak for himself, the one who had had a form of trial was expelled and the other fined $25.

The case is not yet closed, as the men have the right to a hearing before the National officers, and their protests against the unjust action have already gone to headquarters. But the fact that such discipline has been administered by the local union indicates at least a belief by its members that they were acting entirely within their rights and the precedents of the organization. When it is considered that the two victims of this policy of nursing a job, which appears to be still in force, were working in a shop in which they were part owners, and that they were simply directing their efforts toward making their investment pay a dividend, the amazing assumption of the organization that forbids them to do this is something before which the Constitution of the United States dwindles into insignificance.

CONCERNING COMPULSORY ARBITRATION.

The proposals for compulsory arbitration of the anthracite strike are born of the desperate situation in which operators, miners and public find themselves. Perhaps in large part they are a protest against the uncompromising attitude of the operators. For it is certain that sentiment has grown against the companies, in spite of the early efforts of the miners to destroy the mines by stopping the pumps, and in spite of the violence that has helped to offset the popular estimate of what is wrong on the employers' side. We cannot see, in view of the developments that are special to this conflict, that ground has been made for compulsory arbitration, however much the public mind has been impressed with the urgent necessity for a settlement on some basis. Recognition of union rules, for example, is certainly not an arbitrable question. It is eminently a matter about which there must be agreement.

We are not ready in the United States for such a law, for example, as that in New Zealand, which, in fact, requires the men to be organized into a union before they can avail themselves of the machinery of the arbitration courts. American workmen, as organized in unions, are most strenuously opposed to compulsory arbitration. Samuel Gompers announced a doctrine doubtless held by union men generally when he said at the Chicago conference of the National Civic Federation in December, 1900, that "employes have a right to strike for any cause or for no cause." It was Hugh H. Lusk, ex-member of the New Zealand parliament, who in replying to Mr. Gompers and defending the compulsory arbitration act of New Zealand, said that this Gompers doctrine meant the right of the employe "to bring down destruction on the commerce of his country, to bring down misery on thousands of his fellow creatures, and to make himself or his association a curse to the community for no reason at all but because he pleases."

The Pennsylvania strike has impressed upon the public mind more and more the community's stake in an industrial conflict of such magnitude and affecting so important an article of trade; and as has happened in connection with every serious street railway strike in our large cities, there is stout insistence from many quarters that some way must be found by which the people can assert effectively a demand that they be not subjected indefinitely to loss and inconvenience by war between employer and employed. The operation of the compulsory arbitration act in New Zealand is pointed

to in answer to the common objections to an enforcement of this method in the United States. It has been generally represented that the New Zealand plan has proved satisfactory to organized labor as well as to the great majority of employers. But there is accumulating evidence to the contrary. Those who have not been persuaded even by the favorable accounts that have come from this country of Bellamy economics, argue that as New Zealand was coming up out of a period of industrial depression and of bitter and disastrous strife between capital and labor, it has had a time of unbroken prosperity in which to test the new way. It is pointed out that the wage advances and the other benefits which have come to organized labor in New Zealand, under the awards of the arbitration courts, would have come without the courts, because conditions warranted them. In the United States, for example, labor has won most of its contentions in the past two or three years, especially where the issue was one of wages.

With evidences now appearing that the industrial situation in New Zealand may see a turn for the worse, the opposition to the compulsory arbitration act grows more assertive. It is stated in recent telegrams that the employers in Auckland, Canterbury and Wellington provinces have declared themselves strongly against compulsory arbitration; and this reference is made by the New York *Sun* to the refusal of the Wellington Trades and Labor Councils to accept an adverse award: "Why," they asked, "should they obey an adverse award? There was no jail in the colony big enough to hold the lot of them." In other words, they looked upon the court as a wage-raising instrument to be always used in their favor. They have no use for a judge who pronounces against them. "Call that arbitration? Why he has given it against us."

In the United States the probability of attempting the New Zealand experiment, even within the borders of single States, is quite remote. Organized labor opposes compulsory arbitration because its right to strike, to which it ascribes much of the improvement in the condition of wage earners, would be taken away. And organized labor in the United States is not yet ready to put itself on the plane of corporate responsibility that would be a condition precedent to compulsory arbitration. With us public sentiment is still to be the court of appeals. It has already made an award in favor of the anthracite miners on some of their contentions. And on the one which the operators have most strenuously opposed—the right to be represented by their officers in making a collective bargain on wages and conditions of labor, we believe the pressure of sentiment will be felt increasingly. The right to organize, now generally conceded, implies the right to be heard through the machinery of the organization. Moreover, where so just a medium of conciliation is at hand as that provided by the National Civic Federation, there will be less and less tolerance of the position of those, whether employers or employes, who refuse such mediation on issues that in their nature are arbitrable.

Supplementing recent articles in these columns concerning the by-product coke industry, is an interesting discussion elsewhere in this issue, of the market situation as related to the by-products of retort coke manufacture. With 1,105 Otto-Hoffman and Semet-Solvay ovens built and 2,147 building in the United States, and the prospect that by the close of 1903, 20 percent of the coke produced in the United States will come from these ovens, the amount of foreign-made by-products that will be displaced as the new ovens come into operation, represents an important contribution to home industry.

Personal.

E. D. Clarage, manager of the Cleveland branch of the Crucible Steel Co. of America, will sail on the Augusta Victoria on Sept. 11 for a month's vacation in England and France.

John W. Gates has sailed for Europe and will spend six weeks in Scotland.

H. G. Saylor, formerly private secretary to Thomas E. Watt, of the Pennsylvania Railroad Co., has taken a position at the Duquesne offices of the Carnegie Steel Co. as assistant to A. R. Hunt, general manager of the Duquesne mills. He succeeds John J. Utech, who has resigned to become assistant to Joseph E. Schwab, president of the American Steel Foundries, with headquarters in New York City.

One Million Acres of Michigan Lands.

President Wm. G. Mather, president of the Cleveland-Cliffs Iron Co., has purchased for himself and the company one million acres in the upper Michigan peninsula from the Detroit, Mackinac & Marquette Railroad. The land is located in Chippewa, Schoolcraft, Luce and Alger counties and is partly covered with hemlock, spruce, tamarack and other woods suitable for making charcoal, which will be used in the furnaces of the Cleveland-Cliffs Co. Other industries will be established to use the bark and the wood not suitable for charcoal. F. J. Merriam, of Gladstone, Mich., will organize a corporation to handle the lands and to encourage colonization as clearing proceeds. The land is exceedingly rich and it is predicted that the district will become important agriculturally. President Mather is connected with the Munising railroad and the Marquette & Southeastern railroad, and these lines will be greatly benefited by the development of the large tract recently purchased.

The Rebate Tin Plate Question.

One of the tin plate lodges of the Amalgamated Association has requested that a special convention be called for the purpose of considering the 25 percent reduction proposition of the American Tin Plate Co. on rebate tin plate. As yet no convention has been called. The tin plate workers at the Demmler plant of the American Tin Plate Co., who are not affiliated with the Amalgamated Association, have been asked to accept a reduction of 25 percent on an order of rebate plate already taken, but the proposition was refused. The men decided that they would accept a reduction of 10 percent, but their proposition has not yet been accepted.

The Standard Motive Power Co. of New York has closed a contract with the Dover Land & Improvement Co., of Canal Dover, O., for the removal of its plant to the latter place. The company will manufacture locomotives, street car motors and automobiles.

The blast furnace workers located in the Ironton, O., district have asked for an advance of 15 cents per day. When the furnace workers in the Mahoning and Shenango Valleys received an advance last June, the wages of the workers in the Ironton district were not advanced although demands were made.

President T. J. Shaffer, of the Amalgamated Association left this week for Birmingham, Ala., to arrange a new plate scale for the Republic Iron & Steel Co. Before his return to Pittsburg he will endeavor to adjust a number of minor disputes at various mills throughout the country.

PITTSBURG NOTES.

The Monessen plant of the Page Woven Wire Fence Co., Monessen, Pa., was placed in full operation this week. The plant has been idle for some time.

Work on rebuilding a portion of the Wood plant of the American Sheet Steel Co., McKeesport, Pa., was commenced this week. Three additional sheet mills are to be added and the old frame structure is to be replaced by a steel building.

The Crucible Steel Co. of America has secured a charter for the Crescent Steel Co., one of the companies taken over during the consolidation in order to preserve and protect the trade name of the Crescent Steel Co.

The offices of W. P. Snyder & Co., Pittsburg, have been removed from the German National Bank Building to suite Nos. 622, 623 and 624 Frick Building. The offices of the Shenango Furnace Co., an identified interest, have also been located in rooms 625-626 Frick Building. The offices of the Clairton Steel Co., one of the subsidiary companies of the Crucible Steel Co. of America, of which W. P. Snyder is president, have been removed from the German National Bank Building to rooms 618-621 and 631 Frick Building.

The Pittsburg Switch & Signal Co., of Pittsburg, has been incorporated under the laws of New Jersey, with $250,000 capital, to engage in the manufacture of switches and signals for railroad purpose. J. A. Odell, W. E. Jacobs, and L. F. Miller are the incorporators.

During the month of August the Pressed Steel Car Co., of Pittsburg, manufactured 2,730 cars, breaking all previous records. This is an average of 105 cars daily for every working day during the entire month.

Bids are now being received for the buildings and the machinery of the new railroad shops of the Pittsburg & Lake Erie railroad to be erected at McKees Rocks, Pa. The shops will be among the best appointed in the country and when completed will cost approximately $1,000,000. The erecting shop, which will include the machine shop, will be 560 feet long and 170 feet wide. The erecting shop will contain one 100-ton crane which will be sufficiently powerful to lift a locomotive and carry it from one part of the plant to another. In the machine shop there will be 78 machine tools, including lathes, planers, axle-lathes, slotters, drill presses, emery wheels, milling machines, etc. Also seven half-ton electric cranes. Each and every machine will be equipped with a variable speed electric motor, installed by the Crocker-Wheeler Electric Co., of Ampere, N. J. The Westinghouse-Church-Kerr Co. has the general contract for the electrical apparatus, the first-named firm having a sub-contract. The dimensions of the remaining buildings are: Boiler and tank shop, 275x100 feet; storehouse, 100x75 feet; freight car shop, 650x150 feet; blacksmith shop, 200x74 feet; coach shop and planing mill, 300x120 feet; paint shop, 203 feet 2 inches by 85 feet; power house, 100x77 feet. In the latter all power for the plant will be generated including steam, electric, pneumatic and hydraulic energy.

Cralle Bros. & Hobarton, a new firm at Aberdeen, S. D., will erect a large machine shop. An engine, trip hammers, lathes and other iron and wood-working machinery will be put in.

The Allis-Chalmers Co. is preparing to move its plant at Buffalo to West Allis, Wis.

At the agency of Walter H. Foster, of New York, in the Bourse, Philadelphia, the business for August is reported as being large, in fact larger than for any previous month. Deliveries preclude the possibility of much more business, in some lines 1903 being the earliest named.

The Anglo-American Export Agency, New York, has secured orders for chain-making machinery for the English market. The machinery will be built by the Turner, Vaughn & Taylor Co. of Cuyahoga Falls, Ohio.

The Waltham Watch Tool Co., of Waltham, Mass., announces the sale of its plant, business and good will to the Loop-Lock Machine Co. of Boston. The manufacture of precision machinery will be continued under practically the same management as heretofore. H. N. Fisher assumes the presidency of the new corporation and S. A. Barton will be treasurer.

The Commonwealth Steel Co., of St. Louis, announces that it has started its large foundry at Granite City, Ill., and is able to make immediate delivery of steel castings of 25 pounds to 5,000 pounds. The plant has a daily capacity of from 125 to 150 tons, having three 200 ton open-hearth furnaces in operation.

Preliminary plans have been prepared for a freight steamer which will be 50 feet longer than any vessel on the lakes. The name of the prospective owner has not been made public. The steamer will be 590 feet over all and will cost over $400,000.

The shops of the Chicago Belt Forge & Foundry Co., West Pullman, Ill., narrowly escaped destruction by fire Sept. 6. The flames were put out after damage amounting to $10,000 had been done.

Quigley & Krastin are new comers to the machinery market. They have a well appointed factory at Woodbury, N. J., and are introducing a new type of lathe chuck particularly adapted to the uses of valve manufacturers and others having two or more faces on body work to finish. They are also introducing automatic adjustable collapsing taps and selfopening dies which are meeting with much favor as turret lathe and drill press tools. They have already booked quite a number of orders from all parts of the country.

The Pusey & Jones Co., Wilmington, Delaware, is building all the lathes and small machinery for the plant of the Standard Steel Co., Pittsburg.

The American Fork & Hoe Co., recently incorporated with headquarters in Cleveland, has absorbed the Bolles Hoe & Tool Co., of Binghamton, N. Y.

Israel H. Johnson, Jr., & Co., of Philadelphia, manufacturer of lathes, had a very good month, although the alterations in progress at their works hampered them considerably. Shipments and orders were mostly for small and medium sized machines, but were quite numerous. They are now occupying their new three-story office and warehouse building, and are enjoying the much needed increase in shop room afforded by their additional building.

The first cast was made in the foundry of the Allis-Chalmers Co., West Allis, Wis., last week. The opening of the foundry was witnessed by a number of the officials of the company.

The molders employed in the foundries of Buffalo, N. Y., have demanded an increase in wages of 25 cents a day to become effective on Oct. 1. The minimum scale at present is $2.65, but the molders hope to increase this to $2.90 per day. It is doubtful if a strike will be declared, as a conference with the National Founders' Association is to be held at an early date.

Among the first shipments of the new plant of the Alliance Machine Co., Alliance, O., were one 25-ton crane for the Edgar Thomson furnaces of the Carnegie Steel Co., at Bessemer, Pa.; one 25-ton crane and one 15-ton crane to the American Steel & Wire Co., Cleveland. In course of construction are a 10-ton crane for the Carnegie Co. and a 50-ton crane for Worth Bros., Coatesville, Pa.

The Youngstown Engineering Co., Youngstown, O., has received an order for an electric crane of 40 tons capacity with a 15-ton auxiliary hoist from the Carnegie Steel Co. for the Carrie furnace.

The J. W. Creager Agency, at the Bourse, Philadelphia, reports a good business for August, and says that from inquiries received September and October will also prove good months. While orders as a rule have not covered more than one or two machines, the aggregate has been more than satisfactory.

A GERMAN PLATE MILL AND OPEN-HEARTH PLANT.

From a recent issue of *Stahl und Eisen* we take the following article on the plate mill and open-hearth plant of the Rendsburg Steel and Rolling Mill, near Rendsburg:

The German shipbuilders are still compelled, in many cases, to purchase ship plates and structural material that enters into the construction of ships, from foreign manufacturers, due altogether to the low prices at which this material can be delivered at shipyards, owing to the low ocean freights and the fact that this material is brought into Germany duty free. Inasmuch as the German iron and steel mills are nearly all located at great distances from the seaboard, the increased cost of shipping overland makes it practically impossible for the German manufacturers to compete with foreign mills on material for use in the shipyards of the country. For these reasons the location of an iron and steel plant, devoted to the rolling of ship material, near the coast and in the center of the great shipbuilding industry of the country became a necessity.

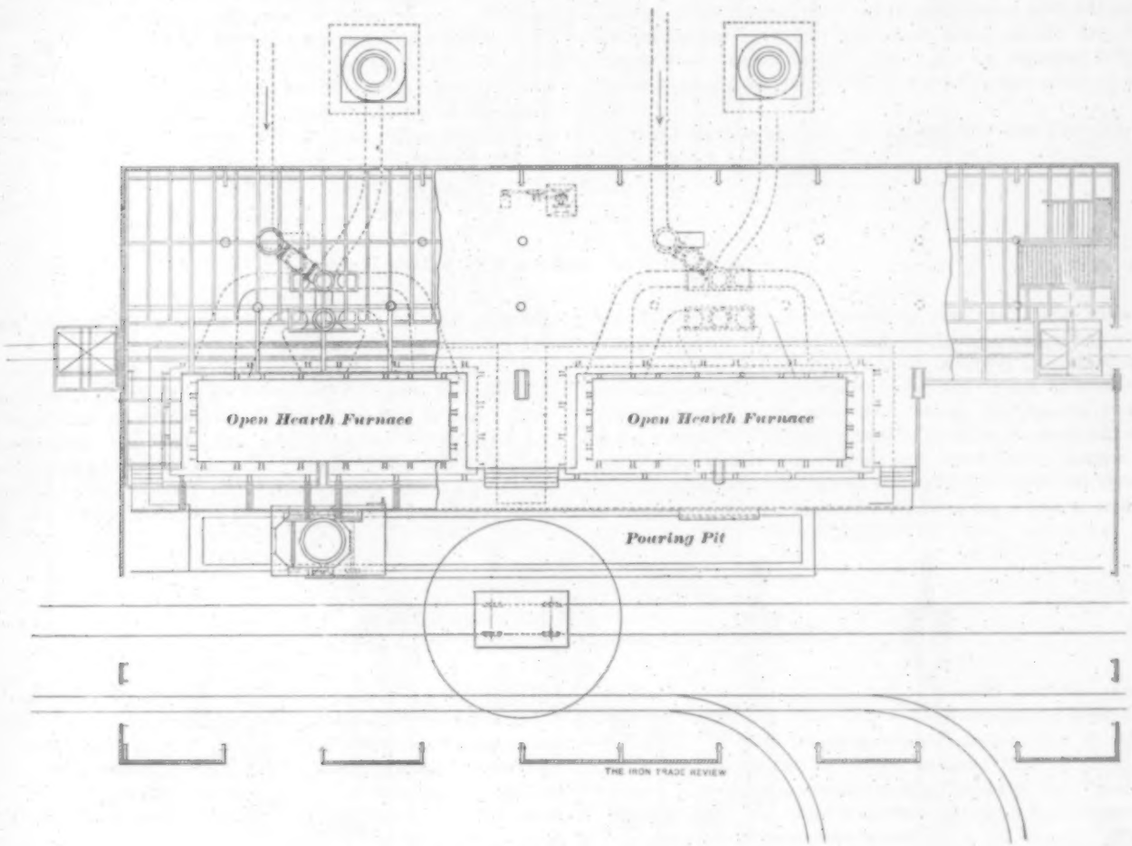


FIG. 1.—PLAN OF OPEN HEARTH PLANT.

The Rendsburg Steel and Rolling Mill was accordingly established on the east side of Audorfer Lake, located near the city of Rendsburg which lies on both sides of the Kaiser Wilhelm canal, the latter affording an excellent waterway for the delivery of raw material to the plant and the shipment of the finished product. The land is of little value for agricultural purposes due to its sandy nature, but is well adapted for the location of manufacturing plants of all kinds owing to its gradual slope and the excellent water obtainable. In addition to the excellent water transportation facilities a connection has been made with the Flensburg & Hamburg railroad, providing excellent facilities for the transportation of material overland. At the present time the erection of a line to connect Rendsburg with Kiel is under consideration. The excellent location and water facilities have resulted in the establishment of a coke plant in the vicinity of the iron and steel works which sends its product to the many blast furnaces and smelters located in Northern Germany.

The present output of the Rendsburg plant consists of ship and boiler plate. Extensions planned provide for blooming mill, structural mill, sheet mill and a merchant mill. Should the deliveries of raw material fail at any time—as no doubt will be the case when the iron and steel industry of the country again prospers—it is intended to erect a blast furnace plant as the site for this has already been secured. For the present a system of docks has been built along the shore of the lake, but as the plant expands it has been decided to erect a series of piers equipped with the most modern loading and unloading devices. In order to secure the best possible use of the land adjoining the shore of the lake and owing to the railroad terminal and the sloping nature of the land it was decided to stock the raw material in the rear of the plant, while sufficient ground has been reserved at a short distance from the plant for the use of the officials of the company and the workingmen. The gas producers were erected parallel to the depth of the site and the engine and boiler house were laid out perpendicular to the gas producer plant, resulting in leaving much unoccupied ground for extensions.

The steel plant, shown in plan in Fig. 1, is commanded by two craneways with spans of 19 and 11m. respectively. The open-hearth furnaces are commanded by the large craneway and the ingot molds, standing in pits, are filled from ladle cars running on tracks above the pits. A steam crane with a capacity of 6 tons is utilized for the carrying of the ingots both in the plant and in the yard. They are taken to the rolling mill by means of the yard railroad.

The furnaces are charged from the building adjoining the open-hearth plant as shown in Fig. 2. A traveling crane picks up the loaded charging boxes, thrusts them into the furnace, dumps them and withdraws them. The boxes have a capacity of 1,000 kg. The installation of this system is much cheaper than the charging device in use in most of the open-hearth plants in the United States, as the pillars of the main building support the crane runway on the one side and the pillars of the small building support the track on the other. This system can be used in a German plant for the reason that the weight to be carried is not nearly as great as that in the American mills.

The two open-hearth furnaces are of the Siemens regenerative type, with a capacity of 25 tons each, and from three to five casts can be made every 24 hours, according to the amount of scrap and pig metal used. Contrary to usage the entire hearth is surrounded and covered with heavy steel

plates and the entire weight of the furnace is carried on pillars anchored to the foundation. In this way the brick work of the heat chambers is relieved of the weight of the furnace and the flow of molten steel into the heat chambers is prevented by the space between the two. The entire furnace is well anchored on a bed of concrete. The gas is carried to the heat chambers from the gas producers by means of underground passages which are well provided with openings both for safety and cleaning purposes. For carrying off the burnt gases, each furnace is provided with a chimney 110 feet in height. The metal is poured from the furnace into the ladle by means of two troughs or spouts. The one, considerably shorter than the other, is adjusted to the opening of the furnace while the second, considerably longer, is a movable trough which conveys the metal from the first trough into the ladle car.

There is also a gas producer plant and a plant for preparing the refractory materials used in the open-hearth plant and in the heating furnaces. The gas producer plant has no extraordinary features outside of the coal handling machinery which reduces manual labor to a minimum. The coal is taken to the producers in dump cars operating on a narrow gauge road, which are lifted and unloaded by means of an electric lifting device and are lowered empty to the tracks. Air is forced underneath the grates of the producers at a pressure of 70 to 80mm, and connected with each of these blast pipes is a pipe carrying steam for cooling the grates. Gas producers of this kind consume about 7 tons of coal every 24 hours and two or three producers are required in providing one open-hearth furnace with gas according to the operation of the latter. The electrical lifting device commanding the gas producers is also used in carrying refractory material to the charging floor of the open-hearth furnaces, the material then being distributed as required.

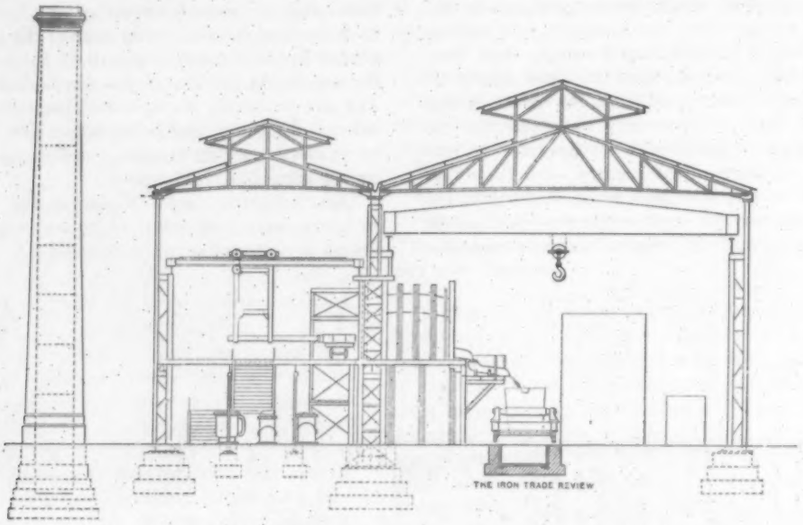


FIG. 2.—SECTIONAL VIEW THROUGH OPEN HEARTH PLANT.

The rolling mill building, as well as the roll turning shop and machine shop, is commanded by a 30-ton traveling crane with a span of 16m. For obvious reasons the distance between the boiler house and the rolling mill engine has been reduced to a minimum. The weight of the ingots that can be reduced on the plate mill varies from 500 to 2,000 kg., and the large sized ingots are heated in soaking pits, while the blooms are heated in furnaces provided for that purpose. Both furnaces are of the Siemens regenerative type and are provided with gas from two producers located just outside of the main building. An electrical traveling crane of 6 tons capacity commands the furnaces.

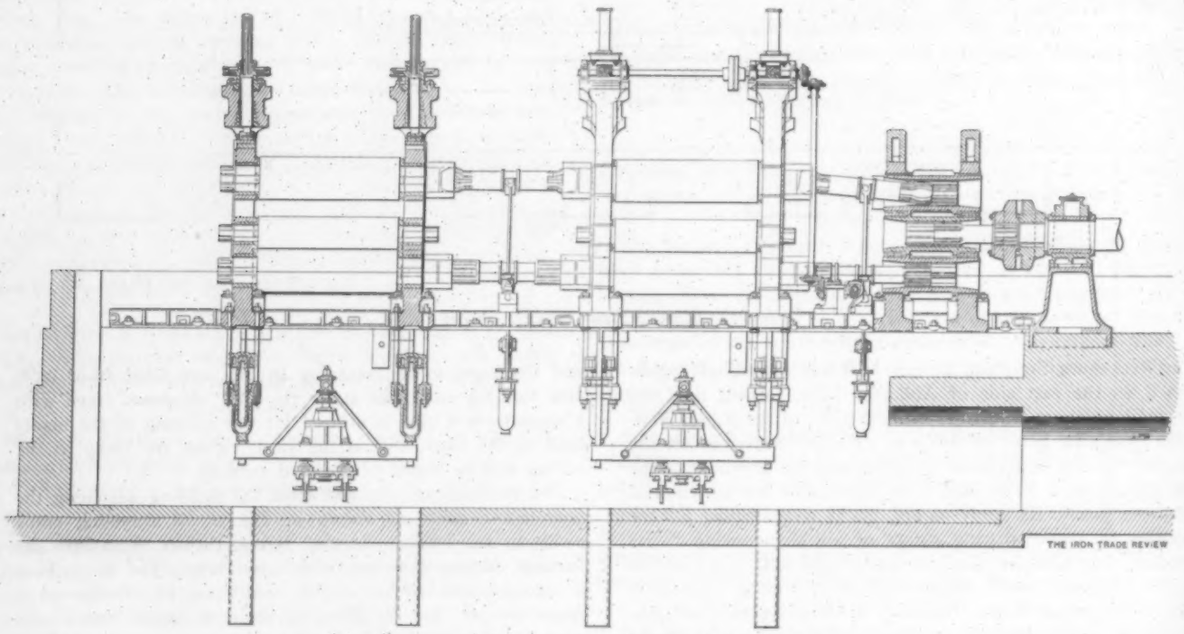


FIG. 3.—ELEVATION OF THREE HIGH PLATE MILL.

The plate mill is three high. The upper and lower rolls are 750 mm. in diameter while the center roll is 550 mm. in diameter, the face of the rolls being 2,500 mm. The mill is ope-

rated by a tandem engine with a 1,100-mm. stroke. The steam pressure is 10½ atmospheres and the steam is superheated from 250 to 300 degrees. The revolutions per minute vary from 70 to 80 and the double piston valve for the high pressure cylinder is regulated by the governor. The flywheel is 8 m. in diameter and weighs approximately 60 tons. The pinion housings are located next to the flywheel, the rolls of the housings being hollow. The latter are 714 mm. in diameter and have 14 cogs each. Contrary to the ordinary custom the coupling instead of being made outside of the pinions is made on the inside of them, this being possible on account of their hollow construction and resulting in a much shorter train of rolls. The weight of the upper roll of the plate mill as well as that of the spindle is compensated by means of hydraulic power and for the lifting of the center roll steam power is used. On either side of the rolls are the roll tables which are lifted and lowered by steam, while a transfer table in front of one of the roll tables carries the ingots after they have been lifted from the soaking pits by the traveling crane to the roll tables. The operation of the transfer table, the roll tables and the rolls is governed by one man stationed on a platform.

Three plate shears are located in the plant, two of which make 23 revolutions per minute and the third makes 15 revolutions per minute. They are peculiarly built and especially well adapted for the cutting of large sized plates, having large throats and are open on the other three sides, enabling the plate to be cut to any size or shape with a very small amount of handling. The plate straightening machine contains seven rolls, five of which are 485 mm. in diameter while the remaining two are 380 mm. in diameter. The faces of the rolls are 2,500 mm. in length. The rolls can be adjusted either by hand or mechanical means.

The power is furnished by five boilers. The coal for the boiler plant is carried into the boiler house in cars on a track about 5 feet above the floor of the boiler room from which it is dumped into chutes and carried to the floor of the boiler house.

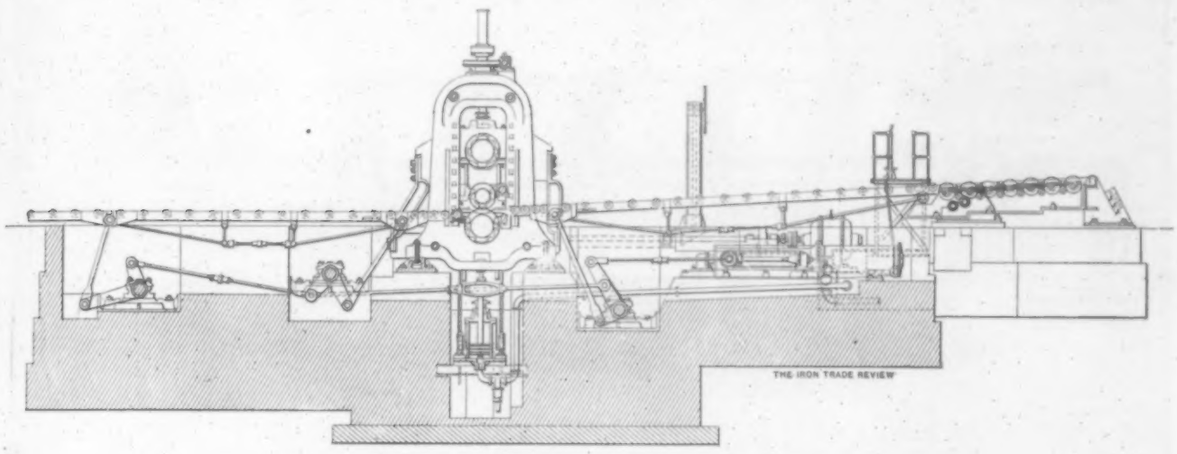


FIG. 4.—CROSS SECTION OF THREE HIGH PLATE MILL.

There is now said to be every prospect that the iron and steel industry in India will attain substantial dimensions in the near future, which will mean extensive purchases for the American equipment of plants. J. N. Tata, of Bombay, head of the firm of Tata & Co., whose New York offices are in the Tontine Bldg., Wall and Water Sts., is now in England and will sail for the United States Sept. 27. London advices state that he has obtained a concession for working extensive iron ore deposits in the Lohara and Pugulgaon districts of the Central Province of India. On his return to India in the winter Mr. Tata will lay down a trial plant, with a view to demonstrating the capabilities underlying the concession he has obtained. A syndicate with a probable capital of over $3,000,000 will be formed and it is estimated that, making every allowance for unfavorable conditions, a daily outturn of 300 tons of steel will be procurable. While here Mr. Tata is expected to make arrangements for the placing of several hundred thousand dollars' worth of machinery, etc.

CONCERNING RIVETS.

Rivets are used to hold together two or more pieces of metal, and to make them practically as solid as if they were of one piece. Where the diameter is less than ½ inch they are called "tank" rivets, and are usually driven cold. Up to 5 years ago all tank rivets were made of Norway or Swedish iron, which is very soft and ductile; but at the present time steel is used with excellent results and is much cheaper. In building large storage tanks some users heat their rivets, but the advantages of this method do not seem to be sufficient to make the practice permanent. As the quality of steel improves it will be found that the cold driven tank rivet will be best, and the only objection would be that the metal was injured by the hammering and setting of the rivet head. "Boiler" rivets are those ½ inch diameter and larger. Both iron and steel are used. * * * Many so-called defects [in iron rivets] have been called to our attention, but the cause has always been due either to overheating or to the fact that the plates had not been properly closed before the riveting began, and this caused a constant spring of the plates and strain on the rivet head, which finally forced it off. Rivets are not intended to bring plates together, but to hold them tight together when properly closed.

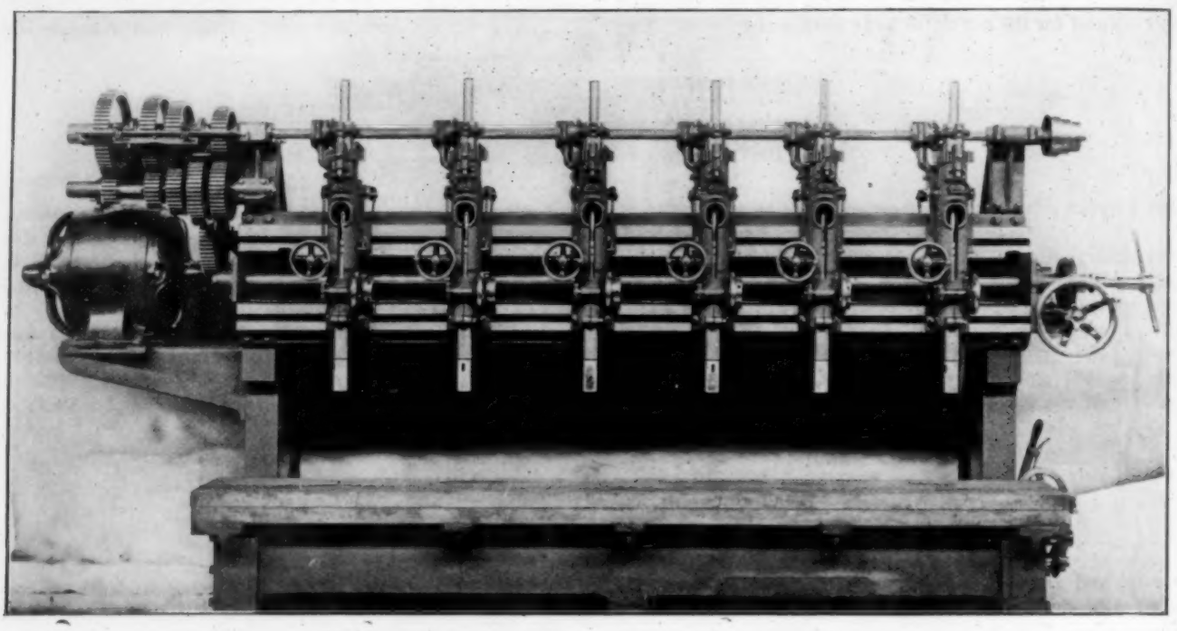
Steel rivets are about 20 percent stronger than iron—are less in price and when properly used in riveting machines are considered better than iron. We do not recommend steel rivets, however, for hand working; first, because about 25 percent more iron rivets can be driven by hand than of steel, and, second, because iron rivets are not subject to the "fatal blue heat" of steel. By "fatal blue heat" we mean that state which steel assumes at a temperature of about 400 degrees, when it is as brittle as cast iron. Steel heated red and allowed to cool passes through this condition and work done at that temperature is most dangerous. It exists in the best as well as in the poorest of steels. Rivets driven by machine are first heated and when the head is set, are still red and should be held there until blue, and so are not exposed to this danger. But in hand driven work the process of manipulation is slow, and as steel cools very quickly the rivet is far from red when the head is set and thus easily becomes crystallized. Thus cracked or broken rivet heads are quite common in hand work where steel is used. "Snap" work is an exception to this where the rivets are finished hot.

Some day machines will be made so powerful, and steel rivets so soft, that all boiler riveting will be done without heating, and we think even today boiler manufacturers that possess modern hydraulic riveters, would be surprised to find how much riveting they could do without heating their rivets. This would be facilitated if their rivets were thoroughly annealed, which can be accomplished at small expense. This process is desirable in order to reduce the strain on the riveter. It would seem to a layman that plates closed with a rivet driven cold would be tighter than with a hot rivet driven hot. Makers of steel boiler rivets do not anneal them, as they are made to be heated before use.—[Ryerson's Monthly.

A NEW MOTOR DRIVEN GANG DRILL.

A large motor driven gang drill has recently been shipped by the manufacturers, the Prentice Bros. Co., of Worcester, Mass., to a Pittsburg firm. A constant speed electric motor is recommended by the company on the ground that if a variable speed motor should be adopted it is necessary to have a surplus power so that when the speed is reduced there will remain a sufficient reserve to drive the machine effectively at a slow speed. It is considered most economical, therefore, to use a small motor which counts for reduction in the initial cost of the motor itself as well as the decreased energy demanded of the generator.

The drilling heads are laterally movable upon the rail, each spindle being counterbalanced and having a vertically independent adjustment for varying lengths of shafts. The spindles are driven by gearing from the top shaft and are controlled by clutches which are actuated by handles placed in front of each head within easy reach of the operator. The machine has hand and power feed with a quick approach and return movement operated by a lever by which all the drills can be instantly lowered or raised together from the work. The feed motion is universal but any of the spindles can be disconnected at will, making any portion of them independent of the others. Three changes of feed are provided and change gears can be supplied to give any required feed.



THE PRENTICE BROTHERS CO.'S MOTOR DRIVEN GANG DRILL.

The tables have both a lateral and a transverse motion. The lateral motion is by a hand wheel and screw, the hand wheel being graduated and provided with a stop. Each graduation of the wheel represents a table movement of 1-16 inch, one revolution of the wheel being equivalent to a table movement of ½-inch. The table has also a transverse motion up to 8 inches by means of a lever and gearing. This arrangement permits the accurate spacing of drilled holes. The machine can also be equipped with an automatic trip and stop motion for determining the depth of drilled holes and is capable of drilling 1½-inch holes through 6 inches of wrought iron or steel plates.

The principal dimensions are as follows: Maximum distance of spindles to tables, 18 inches; minimum distance, 6 inches; traverse of spindles, 12 inches; maximum distance between spindle centers, 10 inches; distance between centers of outside spindles, 9 feet 10 inches; diameter of spindles, 2 inches; cone belt, 4¼ inches; distance between housings, 11 feet; height, 7 feet 10 inches; weight, 13,500 pounds.

The entrance at an early date of the Lackawanna Steel Co. into the rail market is expected to cause some controversy over freight rates on rails. A rail committee, to be known as the Buffalo district committee, has been appointed by the railroads and a meeting of the committee will be held in Buffalo on Sept. 17. It is believed the Buffalo rail committee will ask for an extremely low rate to Cleveland and other Lake Erie ports in order to compete with water lines. The Pittsburg committee will be a unit in opposing such a move. It may be done, however, if the Buffalo committee will grant concessions in favor of the Pittsburg and Youngstown committees. Buffalo heretofore has not been a member of the special committee on new iron and steel rails. The following lines have been admitted as members of the Buffalo district committee: Buffalo, Rochester & Pittsburg; Lackawanna, Erie, Grand Trunk, Lake Shore, Michigan Central, New York Central, Nickel Plate, Pennsylvania, Wabash and the West Shore.

The Troy Steel Products Co., a reorganization of the Troy Steel Co., Troy, N. Y., has been incorporated with a capital of $1,750,000. Among the incorporators are Everett D. Arnold, formerly superintendent of the plant, and Wm. Francis Donovan, formerly vice president of the Yale & Towne Mfg. Co., and more recently connected with the Crane Co., of Chicago. Mr. Donovan will probably have the active management. The furnace plant will be thoroughly remodeled and the building of an open-hearth steel plant and a number of finishing mills is being considered. The company may also acquire coal property and erect coke ovens.

The statement of traffic through the canals at Sault Ste. Marie, Michigan, and Ontario, shows a new record up to Sept. 1, 1902. In the month of August 5,070,491 net tons of freight passed through, making the total for July and August 10,152,889 net tons, or nearly as much as the total for the entire season of 1893, which was 10,796,572 net tons. It is believed the total for this season will be between 34,000,000 and 35,000,000 tons. Last year's traffic through the Soo canals was 1,867,113 tons greater than the combined traffic of the Suez canal and New York harbor.

The new chemical building and the new mining engineering building of the Michigan College of Mines, at Houghton, Mich., were dedicated Aug. 29. The addresses were by Prof. Edward Orton, Jr., dean of the college of engineering, Ohio State University, and Prof. Calvin M. Woodward, dean of the school of engineering, Washington University.

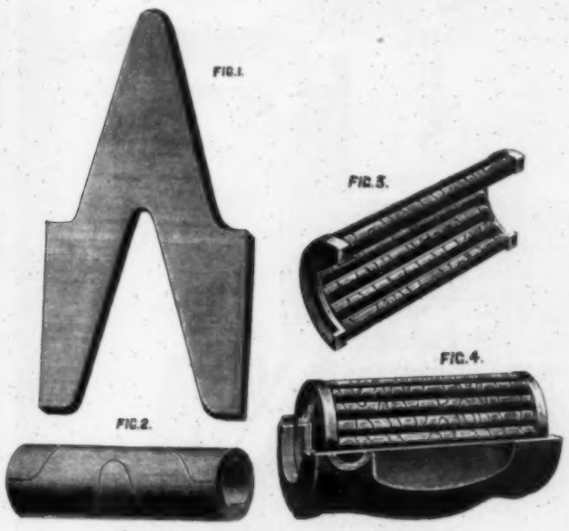
The steamship Hawaiian will start in a few days from Astoria, Oregon, for New York by way of Honolulu. She will carry 100 tons of scrap iron, which she will carry clear around South America to New York. This is a decided innovation in the way of freight.

KYNOCH'S ROLLER BEARINGS.

A design of roller bearing recently introduced by Messrs. Kynoch, Ltd., of Lion Works, Wilton, Birmingham, is illustrated by London *Engineering*. It is a unique specimen of press work in steel and the accompanying illustration and description will be found of interest:

The advantages of roller bearings over plain bearings in a more economical transmission of power are manifest, but difficulty in applying them has been found in their absence of durability. For this reason hardened steel rollers are used, the journal also sometimes being hardened in order to prevent lamination. If the rollers themselves are not hardened, they get distorted owing to the continuous rolling action. Messrs. Kynoch have found that these difficulties can be overcome by making the rollers flexible. They are formed from a special quality sheet steel, which is made in the form shown in Fig. 1. This blank is rolled into the hollow cylinder or roller, shown in Fig. 2. The advantages claimed for this form of roller are that the fiber of the steel is always in the direction of rotation, and this gives an amount of elasticity which prevents distortion by elongation, such as takes place with ordinary steel rollers. The effect claimed is that they are almost indestructible in use.

In Messrs. Kynoch's bearings not only are the rollers of special construction, but a new method of keeping them in



THE KYNOCH ROLLER BEARING.

position has also been introduced. This is shown in Figs. 3 and 4. In place of the ordinary cage or grid—consisting of a sleeve revolving loosely on the shaft, and in spaces cut in the bearings—a cage is formed in two parts, consisting of semicircular ends, which are attached to each other by rods inside the hollow rollers. These rods serve as guides to keep the rollers in the same line as the shaft. This has been found a much preferable arrangement to the ordinary method of having solid rollers and keeping them parallel to each other, and also axial with the shaft, by means of holes in the sleeve, or by dividing the space up by short bars. With the new arrangement the rollers are not liable to get jammed by grit, and thus have flats worn on them. The cage revolves about once to every two revolutions of the rollers, so that the wear is well distributed over their whole surface. The results of tests made by Messrs. Kynoch show that the coefficient of friction of repose is .0115, and the coefficient of motion is .0082. On a test made by Messrs. Crompton & Co., at Chelmsford, with two lengths of 3-inch shafting, each 90 feet long, doing similar work, and both running at 170 revolutions per minute, the following results were obtained: The shaft with nine plain cast iron bearings, with endless chain lubrication, required 1½ horsepower to run it light. The shaft with Kynoch roller bearings, running light, needed but ⅜ horsepower. The saving in oil is naturally considerable, only occasional lubrication being needed.

The bearings need no attention when once properly fixed; but care should be taken that the shafting is not worn, and that it is in alignment. Bearings from 1¼ inch up to 4 inches are made as standard sizes, and the bearings are made to suit ordinary standard swiveling hangers or plummer blocks.

A Campaign of Education.

The National Economic League, of New York city, composed of the most prominent and successful merchants and manufacturers of the metropolis, is about to inaugurate an educational campaign which it believes will do much to prevent conflicts between capital and labor. The organizers and members of the National Economic League believe that the remedy for the political and financial ills of the country is not in a more socialistic government, but in a more thorough education in the science of economics. It is proposed that the capitalist and workingman, from the richest to the poorest, from the highest to the lowest, shall be reached through the work of the league in this campaign of education. The members of the executive committee in charge of this campaign are:

Gen. Stewart L. Woodford (ex-Minister to Spain), president; Hon. Silas B. Dutcher (president Hamilton Trust Co.), Brooklyn, chairman and treasurer; Chas. A. Moore (Manning, Maxwell & Moore), New York city; Ludwig Nissen (president Manufacturers' Association of New York); Gustav H. Schwab (North German Lloyd S. S. Co.); Samuel Spencer (president Southern Railway System); Hon. Chas. A. Schieren (ex-mayor of Brooklyn, treasurer National Manufacturers' Association); Hon. John C. McGuire (ex-Surveyor Port of New York); Thomas R. Horton, secretary, New York City.

As a result of the movement started by Southern blast furnace owners to have 2,240 pounds adopted as the ton for all pig iron instead of having a 2,240-pound ton for some kinds and a 2,268-pound ton for other kinds, a number of furnaces in the Mahoning, Shenango, and Hocking valleys and elsewhere have adopted the 2,240-pound ton and others are expected to do so.

Hickman, Williams & Co., pig iron selling agents, with offices in Louisville, Chicago and St. Louis, have their St. Louis offices in charge of B. P. Williams, Western manager. It is located in the Commonwealth Trust Bldg., and was opened May 1, 1901. The furnaces represented are those of the Woodward Iron Co., Woodward, Ala.; Red River Furnace Co., Clarksville, Tenn.; Standard Iron Co., Goodrich, Tenn.; and the Virginia Iron, Coal & Coke Co. The brands sold are Woodward, Helen, Red River, Standard, Watts, Bristol, Crozer, Dora, Max Meadows, Radford and Buena Vista.

An immense number of cars and engines are required to move the coke now being produced in the Connellsville region. To move 250,000 tons of coke—the average product per week for several weeks—requires about 12,000 cars, about 300 trains of forty cars each, or one solid train almost 73 miles long, to haul which about 600 of the Pennsylvania Railroad's largest engines would have to be pressed into service. The Frick Coke Co. controls about three-fourths of the plants of the region and has in its employ about 15,000 men, who are now receiving higher wages than ever before known.

The manual training school at Homestead, Pa., presented to that city by President Schwab, of the United States Steel Corporation, will be opened Oct. 1. A three-story stone structure has been erected and filled with machinery, the cost to Mr. Schwab being about $100,000. There the boys of Homestead will be taught in such a way as to make them useful in the mills. There will be a seven years' course which will not interfere with the boys' regular school work. Special attention will be given iron and steel working and mechanical drawing. Girls will be instructed in cooking, sewing and household economics. Formal dedication has been postponed until Mr. Schwab can attend.

The Empire Shipbuilding Co., Buffalo, is said to have obtained a contract for the construction of ten steel tugs, to cost $225,000. Officers of the company decline to give the name of the company having the tugs built.

THE BLAKE MOLDING MACHINE.

The Blake roll-over molding machine is one of the simpler class of machines designed to turn out accurate work with unusual rapidity. It draws the pattern, but does not ram the mold, the experience of the manufacturer having shown that while automatic peening and ramming may take slightly less time, the losses from bad castings with this method are greater than with hand ramming. Referring to Fig. 1, the essential parts of the machine are as follows: The roll-over table A swinging on trunnions in the side frame and capable of being securely locked in upright or reversed position by clamps B or C respectively; the elevating table F, which is counterpoised by the weight G, and is capable of being easily raised and lowered by the handle H through a simple system of levers in the pit beneath the machine; the receiving table D which rests on the elevator and can be drawn out on the tracks E when the elevating table is down, as shown in Fig. 1.

The operation of the machine is simple and can quickly be learned by any laborer of ordinary intelligence. The packing box M with pattern plate N attached as shown in Fig. 1 is bolted to the table and the nowel placed in position over the pattern. The iron flasks used with this machine are made interchangeable, that is, any cope will fit any nowel and vice versa. The nowel is locked tightly against the packing box by a simple rotary motion of the dogs which brings the latter hard upon the lugs of the nowel. The dogs J. K. are clamped fast to the two vertical rods, but may be adjusted up and down to suit the different sizes of flasks. These rods turn freely in the table but cannot slide through it. The nowel is now ready to be rammed. This is done by hand and with a little practice the workman can perform this operation quickly and thoroughly.

This operation being completed, the clamp B is loosened and the roll-over table reversed and locked in its new position by the clamp C. Fig. 2 shows the workman in the act of reversing the table. The elevating table is then raised by means of the lever H until the receiving table with bottom plates strikes the flask, as shown in Fig. 3. The dogs J are now loosened by striking the dogs K, thus freeing the nowel from the packing box. The workman now taps the roll-over table with a wooden mallet and at the same time gently lowers the receiving table. The nowel is now complete and ready to be drawn out as shown in Fig. 4. When a convenient number of nowels have been made, the workman reverses the pattern and proceeds with the copes in the same manner as described.

The points which the makers claim for their machine are the following: Its simplicity and ease of working make it a rapid machine; the fact that the mold is hand rammed reduces the loss to a minimum; no securing by bars on gaggers is necessary in the flask; the machine is compact and requires but little floor space; the workman has but little lifting to do, and the machine is strong and economical. The machines are at present made in but one size, which is adjustable to flasks of the following dimensions: 10x10x2½ inches deep to 30x18x10 inches deep. Several of the Blake machines are at present doing active service at the foundries of the makers, the Geo. F. Blake Mfg. Co., at East Cambridge, Mass.

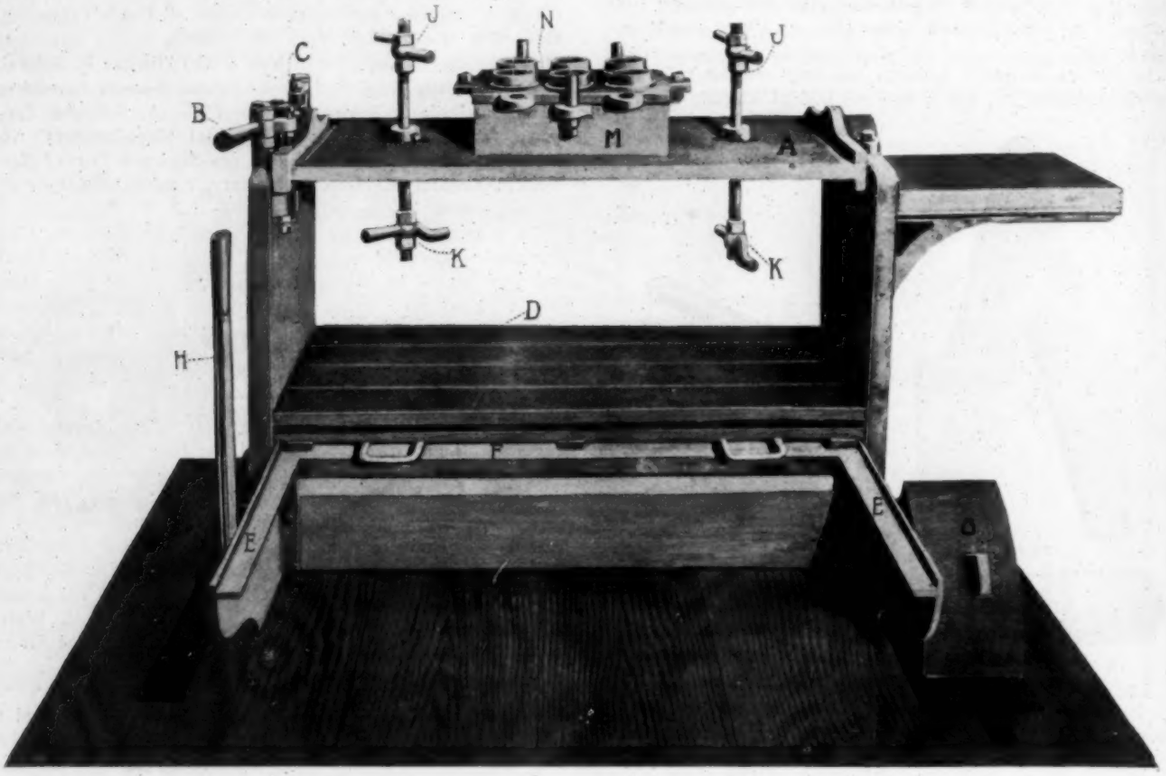


FIG. 1.—BLAKE ROLL-OVER MOLDING MACHINE.

THE FUTURE OF THE TIN PLATE TRADE.

The proposal to reduce wages on labor entering into export tin plates from the mills of the American Tin Plate Co. has naturally been viewed with some apprehension on the other side of the water. The London *Iron and Coal Trades Review's* comments in the following article indicate that the Welsh manufacturers in the mind of the writer have real cause for apprehension. We have already said that whatever came of the wage proposal it might be set down as a prime factor in this whole question, that American tin plate manufacturers will not long endure the importation of so considerable a percentage of the tin plates used by American manufacturers, and that a way would be found to land this business in domestic mills. Our contemporary says:

"The present output of tin plates in America is largely in excess of the consumption—probably 20 percent. In the course of a few months the output will be further increased. The proposal of the American Tin Plate Co. is that to secure a foreign export trade, beginning with the drawback trade, a special wage reduction should be fixed for export plates of 25 percent or 30 percent, which, spread over the domestic and export trade, would not exceed 3½ percent or thereabouts. It is pointed out to the men that the production would be at once increased by 16⅔ percent, which would have the effect of increasing the earnings of the workers by 12½ percent. There are now 87 new tin plate mills working outside the trust in the

United States of America, and by the end of this year the number will be increased by a further 37 mills, or a total of 124. The trust have 274 mills, and there are 108 tinning sets in 12 dippery works.

"There cannot be the slightest doubt, therefore, that in a short time competition in the manufacture and sale of tin plates in America will be severe—sharp enough to drive some of the mills, probably those outside of the trust, out of business. The United States Steel Corporation, of which the American Tin Plate Co. is a component part, carry their processes of manufacture clear black to the ore in the ground, and must be the controlling factor in the situation. As profits distributed over so many successive operations to the rolling mills need not be individually heavy to make the entire business pay, and pay well, there is no doubt the tin plate trust can, whenever they choose, make a heavy cut in the prices of tin plate, both domestic and foreign, and when this comes, and it may come any day, it will be no half-way measure.

"This is quite apart from the rolling of black plates by an entirely new process, now nearing completion, which is the monopoly of the trust. With or without this the trust would appear to have their rivals in America and Wales at their mercy, for it seems clear, though we don't think our Welsh friends have quite realized it, that the attack upon the rebate trade will be the signal for a still more severe attack upon the entire foreign trade of Wales. There is a question, first, of cost of production, and second of freights. Freights from America are notoriously lower to our great Eastern markets than from British ports, and even British shipowners assist in this unpatriotic attempt to injure the commerce of Great Britain, as witness the circular sent to American shippers by the New York agent of the Houston line of steamers to South Africa from New York, in which the American shippers are assured that in conjunction with the Prince line (another British line), they 'will at all times make rates which will enable the American merchants and manufacturers to compete with those of Europe.'

"It thus appears that the American makers and British shipowners are combining to take trade from Great Britain, and they will succeed in their attempt if Welsh tin plate makers and other British ship owners do not secure cheaper methods. Once the Welsh export trade in tin plates is attacked, and attacked it will be without any doubt, the remaining Welsh trade in tin plates, viz., the domestic trade of Great Britain, amounting to over 4,000,000 boxes yearly, will be in jeopardy. Certainly the Welsh tin plate trade appears to be the sport of fortune. Its monopoly of the world's trade in tin plates, prior to the uprising of the American industry, 10 years ago, has been rudely destroyed, and if the trade which still remains is not extinguished altogether in the course of a comparatively brief space of time, it will not be the fault of the incessant endeavors of the Americans to utilize to the utmost their enormous natural advantages in the shape of cheaper steel and fuel, aided by the latest up-to-date methods in economizing labor and placing no limit on the output. What the former organ of the Welsh Tin Plate Workers' Union, the *Industrial World*, now happily defunct, denounced as 'body and soul destroying toil' appears to be the normal day's work of the American roller man, and also of his Welsh fellow-worker, who has left Wales and gone to work in America. This may be hard reading for our Welsh friends, but the facts are present to the ordinary observer and cannot be gainsaid."

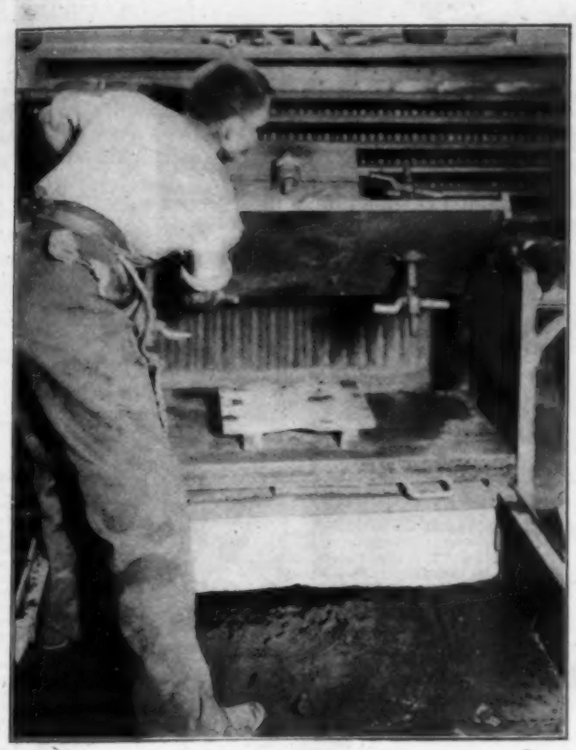


FIG. 2.—REVERSING THE ROLL-OVER TABLE.

FIG. 4.—DRAWING OUT THE NOWEL.

Regarding China as a market for plows United States Consul Henry B. Miller, stationed at Niuchwang, in a report to the State Department, says in part: "North China, Mongolia, Manchuria and that part of Siberia bordering on the Pacific are destined soon to become consumers of American agricultural implements. The greater part of this country is susceptible of cultivation. The production of wheat is already a leading industry in various localities. It is carried on without the use of any modern machinery. An expert should be sent to the country to investigate all the conditions and the plow should be designed to meet them. The market, if secured and cultivated, will receive millions of plows."

The Ohio legislature last winter passed a law prohibiting the erection of any boiler making plant or similar manufactory within 600 feet of the penitentiary at Columbus. Borger Bros., who had purchased land opposite the office of the penitentiary before the law was passed, now announce that they will begin the erection of their boiler works and compel the State officials to prove the constitutionality of the law, which was based on the claim that the noise from the works would be a nuisance and prevent prisoners from sleeping.

At the new docks of the Illinois Steel Co., Chicago, a few days ago, 5,440 gross tons of iron ore were taken out of the steamer James H. Hoyt in four hours, the fastest unloading ever done on the lakes.

A NEW BASIC BESSEMER STEEL PROCESS.

Samuel McDonald, Youngstown, O., has recently obtained a patent on a process of manufacturing basic Bessemer steel and the present and the proposed methods are described by the inventor as follows:

"The prevailing process of making basic Bessemer steel is substantially this: The Bessemer vessel is lined with magnesian lime, a quantity of well-burnt lime is placed in the bottom of the vessel, and the metal which is to be converted is introduced in molten condition. The charge is then blown in the ordinary manner until the carbon is eliminated, this stage being indicated by the drop of the carbon flame. Instead of terminating the blow on the drop of the carbon flame, which is the practice in making ordinary or acid Bessemer steel, the blow is continued for an interval of time, which is termed the 'afterblow.' During this interval the reaction between the charge and the basic substances within the converter continues and brings about the substantial elimination of phosphorus and other foreign substances, which elimination constitutes the production of 'basic' steel. Spiegeleisen or ferromanganese is then added, as in the ordinary Bessemer process, and the finished steel is then cast. The process thus described is attended with practical difficulties of such magnitude that it is not today a commercial success. One difficulty is to determine the duration of the afterblow. While the substantial removal of carbon is clearly indicated by the 'drop of the flame' in the mouth of the converter, there is no pronounced indication of the substantial removal of phosphorus. It is necessary, therefore, to make tests of each charge when the operator judges the afterblow to have continued for sufficient time, and if the amount of phosphorus is still too great the blow must be renewed. Such testing and blowing again consume time and retard the production. Another defect is due to variations in the temperature of the charge on the completion of the process, these variations being due to delays which are occasioned by testing, reblowing, and repairing the converter lining, for to obtain the best results the steel should be cast at a temperature slightly above a certain minimum. Another defect is due to the fact that when spiegeleisen or ferromanganese is introduced into the metal in the converter or ladle it tends to react with the slag and to effect a reintroduction of phosphorus into the composition of the metal.

"My improvement consists in providing a receiving tank or furnace of sufficient size to contain at one time the charges from a number of converters. Into this tank I pour the charge of each converter, and from it I take the metal for casting. I test each converter charge in turn, as in the former practice; but instead of holding each charge subject to the result of the test and renewing the blow if too much phosphorus remains I turn the charge without delay into the receiving tank and determine the treatment of the next succeeding charge by the result of the test of the charge which has preceded it. Thus if the test of a given charge reveals the presence of too much phosphorus, though I have already introduced that charge into the receiving tank, I continue the treatment of the next charge not only for such time as is deemed sufficient to reduce to the proper degree its phosphorus element, but for an additional time, and I thereby eliminate so much phosphorus from that charge that when it shall be introduced into the receiving tank the phosphorus element of the entire contents of the tank shall not exceed the proper amount. It is obvious that instead of testing each charge as it goes to the receiving tank I may test the contents of the tank after the introduction of each converter charge and determine the treatment of succeeding converter charges by the results of these tests. By adopting this method of treatment I avoid the delay incident to the former practice as I have described it. My receiving tank is preferably a furnace, and being able to control the heat applied to it I am able to maintain the metal in the tank at the proper casting temperature.

"It will be understood that in practicing my invention I may either begin to withdraw metal from the receiving tank after it has been filled and continue to withdraw metal until it is

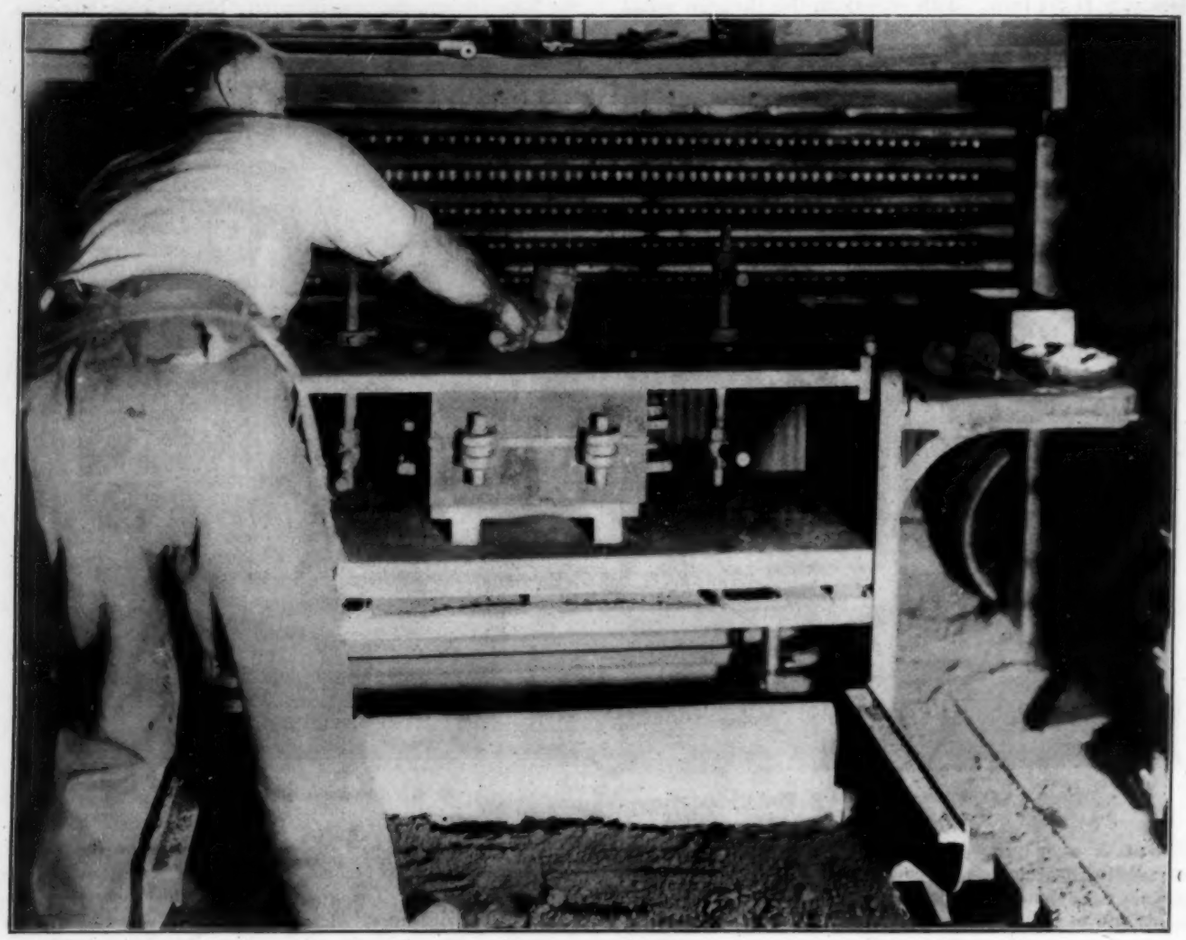


FIG. 3.—AFTER THE ELEVATING TABLE HAS BEEN RAISED.

again empty or I may keep adding new converter charges while withdrawing metal for casting. I find it desirable to have two receiving tanks, such as I have described in connection with a Bessemer plant, and to draw from one while filling the other. By employing the receiving tank I am able to remove the phosphorus-containing slag before the introduction of spiegeleisen or ferromanganese, and I may thus avoid any deleterious effects of chemical action of the slag upon these substances."

PRODUCTION OF MANGANESE ORE IN 1901.

In his monograph for the United States Geological Survey on the production of manganese ores in 1901, in the United States and foreign countries, John Birkinbine, reports a total production in the United States amounting to 11,995 long tons, value at $116,722. This is against 11,771 tons in 1900. Virginia, as in 1900, heads the list with 4,275 tons; Georgia is second, with 4,074 tons, and Utah third, with 2,500 tons. Of manganiferous ores, Colorado produced 62,385 tons, containing 16 to 30 percent of manganese; the Lake Superior region 512,084 tons, with from 1 to 10 percent manganese, generally not over 1 percent, and North Carolina produced 20 tons.

The great part of the manganese ores used in the United States is imported from various foreign countries, the amount brought in during the year 1901 being 165,722 long tons, valued at $1,486,573 or $8.97 per ton. The principal shippers in 1901 were Brazil, Russia, Cuba, Turkey, Chile, and India, in the order named. Ore is also obtained from Japan, Spain, Germany, Colombia, England, etc. The following table will show the imports of manganese ores into the United States during the calendar years 1899, 1900, and 1901, inclusive, by countries, together with the valuations of the ores:

IMPORTS OF MANGANESE ORES INTO THE UNITED STATES DURING THE CALENDAR YEARS 1899, 1900, AND 1901, BY COUNTRIES.

Country.	1899.		1900.		1901.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.
	Long Tons.		*Long Tons.*		*Long Tons.*	
Brazil	28,115	$399,877	54,451	$590,825	48,029	$460,024
Russia, Black Sea	73,397	598,644	132,121	812,593	32,600	234,798
British East Indies	17,950	54,471	10,650	30,787	11,000	40,148
Cuba	16,359	221,785	20,582	259,348	21,627	307,084
Chile	17,575	111,726	9,925	69,670	14,794	104,364
Colombia	8,900	82,489	7,902	86,678	2,500	34,800
Turkey in Asia	5,782	46,822	7,062	49,482	5,980	43,653
Turkey in Europe	8,310	61,241	6,186	43,593	11,879	87,380
Japan	4,492	31,667	5,338	44,707	5,995	52,443
France	2,983	21,086				
Germany	1,274	34,937	1,696	43,035	4,184	76,827
United Kingdom	134	6,697	156	7,466	468	10,563
French West Indies			65	650		
Greece	3,030	10,526	50	897		
Quebec, Ontario, etc.			39	1,100	469	3,669
Nova Scotia, New Brunswick, etc.	78	2,586	19	1,114	29	1,110
Austria-Hungary			10	427		
Spain					6,050	38,947
Netherlands					29	763
Total	188,349	$1,584,528	256,252	$2,042,361	165,722	$1,486,573

The United States is the largest producer of steel in the world, the amount manufactured in 1901 being approximately 13⅓ million tons, and in the production of this steel a large amount of ferromanganese and spiegeleisen is used.

It is estimated that the manganese requirements average—

11 pounds per ton of ingots for open-hearth steel;

16 pounds per ton of ingots for soft Bessemer steel;

31 pounds per ton of ingots for rail Bessemer steel.

In the year 1900 the bulk of "ferro" and "spiegel" was manufactured in the United States principally from imported ores, but during the year 1901 the foreign ferro and spiegel were attractively low in price, and the demand in this country for prompt deliveries of pig iron was brisk, so that a number of the larger companies preferred to keep their blast furnaces on Bessemer mixtures and to import such manganese metal as might be required, rather than to manufacture it. This will account for the falling off in the imports of manganese ore in 1901, when it would be supposed that, in view of the large amount of steel produced, they would have increased. The importations by customs districts show that over half of the total foreign manganese ore was received at the port of Baltimore, about one-seventh at Philadelphia, and that the remainder was scattered among a number of ports, principally on the Atlantic seaboard, as will be seen from the following table:

MANGANESE ORE IMPORTED INTO THE UNITED STATES DURING THE CALENDAR YEARS 1899, 1900 AND 1901, BY CUSTOMS DISTRICTS.

Customs District.	1901.		1900.		1899.	
	Quan.	Value.	Quan.	Value.	Quan.	Value.
	Long Tons.		*Long Tons.*		*Long Tons.*	
Philadelphia, Pa	24,396	$ 188,869	80,353	$ 726,345	90,583	$655,061
Baltimore, Md	120,579	1,004,750	161,932	1,144,823	80,006	739,547
New York, N. Y	8,103	110,979	13,885	179,044	14,762	152,959
Norfolk, Va					2,961	32,248
Pittsburg, Pa	40	2,094	25	1,578	44	2,473
Newport News, Va	26	862	15	868	26	1,351
Chicago, Ill	48	2,302			16	595
Boston, Mass	25	691	1	24	3	116
Passamaquoddy, Me			2	30	4	82
Pensacola, Fla	8,935	127,159				
Mobile, Ala	3,100	44,100				
Huron, Mich	366	3,170				
Champlain, Mich	72	499				
All others	2	108	61	1,849	2	96
Total	165,722	$1,486,573	256,252	$2,042,361	188,349	$1,584,528

The comparative figures of the production of manganese ore in the United States and the amounts imported from the years 1889 to 1901, inclusive, indicate a gradually increased importation of manganese ore, with but four exceptions, from 1889 to 1900, inclusive, while in the year 1901 there was a falling off to 165,722 tons, a decline of 90,530 tons from the maximum of 256,252 long tons in 1900. The average domestic production for thirteen years amounted to 13,949 tons, valued at $125,773, while the imports in the same period showed an average of 92,413 long tons, valued at $853,627. The United States has, therefore, in the interval named, produced about 13 percent of the manganese ores which were consumed in the country.

PRODUCTION IN FOREIGN COUNTRIES.

The Russian Empire is the largest contributor of manganese ores, one-half of the world's output being credited to that country. The greatest portion of this ore comes from the Caucasus district, followed in order by South Russia and the Ural districts. A reduction, in 1899, of the high freight rate charged by the Russian Government for the haul from Chiaturi to Sharopan, together with good prices and a brisk demand, resulted in the maximum output for the district in 1899, later figures not being obtainable. The major portion of the manganese ore obtained in the Caucasus district is exported.

It is difficult to secure late data in regard to the production of manganese ores in various foreign countries, but in the accompanying table the latest figures obtainable are given, together with the year of record. The tons are either long or metric, except in Canada, where the short ton is used. No statistics in regard to manganiferous iron ores are included.

WORLD'S PRODUCTION OF MANGANESE ORES.

Country.	Year.	Product'n.	Country.	Year.	Product'n.
North America:			Europe—Continued.		
United States	1901	11,995	Italy	1900	5,919
Canada*	1901	440	Portugal	1900	1,972
Cuba*	1901	25,183	Russia	1899	646,582
South America:			Spain	1901	91,672
Brazil*	1901	95,710	Sweden	1901	2,235
Colombia*	1901	684	Turkey exported from Salonica	1900	38,100
Chile*	1901	31,477	Asia:		
Europe:			India	1900	130,670
Austria	1900	8,804	Japan	1901	8,726
Bosnia and Herzegovinia	1900	7,813	Java	1899	1,388
Hungary	1900	5,746	Oceania:		
France	1900	21,574	New South Wales	1901	12
Germany	1900	58,269	Queensland	1900	75
Greece	1901	14,166	New Zealand	1900	166

* Exports.

The important producers according to rank are Russia, India, Brazil, Spain, Germany, Turkey, Chile, and Cuba.

The erection of the new buildings of the Monarch Typewriter Co., Syracuse, N. Y., has been completed and the equipment is being put in. The plant will turn out 1,000 typewriters per week and employ about 1,000 men.

The American Can Co.'s factory at Astoria, Oregon, will be moved to Portland, Oregon, and the capacity of the plant will be doubled.

CENSUS STATISTICS OF THE IRON INDUSTRY.

A bulletin of the twelfth census of the United States, just published, is devoted to the iron and steel industry. The report is made by Wm. G. Gray, of Philadelphia, statistician of the American Iron and Steel Association, and is exhaustive in its presentation of the statistical history of the iron industry for the year 1900. In transmitting the report, S. N. D. North, chief statistician for manufactures, summarizes its principal tables as follows:

"The reports show a capital of $590,530,484 invested in the iron and steel industry in the 669 active establishments reporting for the United States. This sum represents the value of land, buildings, machinery, tools, and implements, and the live capital utilized, but does not include the capital stock of any of the manufacturing corporations engaged in this industry. The value of the products is returned at $804,034,918, to produce which involved an outlay of $11,741,788 for salaries of officials, clerks, etc.; $120,836,338 for wages; $32,274,100 for miscellaneous expenses, including rent, taxes, etc.; and $522,431,701 for materials used, mill supplies, freight, and fuel. It is not to be assumed, however, that the difference between the aggregate of these sums and the value of the products is, in any sense, indicative of the profits in the iron and steel industry during the census year. The census schedule takes no cognizance of the cost of selling manufactured articles, or of interest on capital invested, or of the mercantile losses incurred in the business, or of depreciation in plant. The value of the product given is the value as obtained or fixed at the works."

Mr. Gray presents his material under four heads: 1. The iron and steel industry as a whole. 2. The manufacture of pig iron. 3. The manufacture of steel ingots and steel castings and rolled iron and steel. 4. The manufacture for sale of iron blooms, billets, and hammered bar iron. In all 73 tables are presented. In drafting the schedules of inquiry for the census of 1900, care was taken to preserve the basis of comparison with prior censuses. Comparison is thus possible with respect to all the items of inquiry except those relating to capital, salaried officials, clerks, etc., and their salaries, the average number of employes, and the total amount of wages paid. Live capital—this is, cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries—was first called for at the census of 1890.

The comparative summary shows that while the number of establishments has decreased from 808 active and idle in 1870 to 669 active in 1900, the capital invested has increased from $121,772,074 in 1870 to $590,530,484 in 1900; the number of wage-earners, from 77,555 in 1870 to 222,607 in 1900; the wages paid, from $40,514,981 in 1870 to $120,836,338 in 1900; the cost of materials used, from $135,526,132 in 1870 to $522,431,701 in 1900; and the value of the products, from $207,208,696 in 1870 to $804,034,918 in 1900. During the 30 years under review the tonnage of pig iron, steel castings, rolled products, hammered blooms, etc., increased from 3,263,585 gross tons in 1870 to 29,507,860 tons in 1900.

Comparing the leading details for 1900 with those for 1890, we find a decrease in the number of active establishments of 50, an increase in the capital invested in active establishments of $176,485,640, and an increase in the average number of wage-earners of 51,426. The number of men, 16 years of age and over, increased 50,692, and the number of women, 16 years of age and over, increased 1,013, but the number of children under 16 years of age employed shows a decrease of 279. The miscellaneous expenses increased $14,059,152 in 1900 over 1890, the cost of materials, $195,158,856, and the value of products, $325,347,399. In quantity, the products increased in the same period 13,243,382 tons.

Of the total capital reported for active establishments in 1900, namely, $590,530,484, Pennsylvania contributed $321,985,659, or considerably over one-half, as compared with $226,294,407 in 1890 (total, $414,044,844), still over one-half, and $102,956,223 in 1880 (total, $209,904,965), a little less than one-half. The average number of wage-earners employed in the whole country in 1900 was 222,607, who were paid wages amounting to $120,836,338. Of these totals Pennsylvania gave work to 110,864 wage-earners, almost one-half of the total reported, paying them $61,908,405, or over one-half of the wages paid in this industry in the United States. In 1890 the average number of wage-earners reported by the State was 92,473, and for the whole country it was 171,181. Pennsylvania contributed $283,142,785 to the total cost of all materials used by iron and steel establishments, including freight charges, or considerably more than half the total of $522,431,701 for the iron industry of the country.

Of the total capital invested in 1900, Ohio, which ranked second in the manufacture of iron and steel, reported $86,477,552, as compared with $37,642,887 in 1890 and $22,807,606 in 1880. The average number of wage-earners reported was 33,677 in 1900, 23,546 in 1890, and 20,071 in 1880, the wages paid to these workers amounting to $19,730,469 in 1900, $13,262,141 in 1890, and $8,265,070 in 1880. The cost of materials, including freight charges, was $91,329,307 in 1900, $44,551,301 in 1890, and $23,997,915 in 1880. The value of the products amounted to $138,935,256 in 1900, compared with $65,206,828 in 1890 and $34,918,360 in 1880.

Illinois, which was third in importance in 1900 in the manufacture of iron and steel, had capital invested in that year to the amount of $43,356,239, compared with $34,689,919 in 1890 and $5,795,620 in 1880. The average number of wage-earners employed in 1900 was 16,642, compared with 8,685 in 1890 and 5,253 in 1880. The wages paid amounted to $9,640,716 in 1900, $5,220,883 in 1890, and $2,508,718 in 1880. For materials, the active iron and steel establishments in Illinois paid $41,729,261 in 1900, $30,039,674 in 1890, and $14,977,145 in 1880. The value of their products amounted to $60,303,144 in 1900, $39,011,051 in 1890, and $20,545,289 in 1880.

The details given above show that in 1900, 76.5 percent of the total capital reported by all active iron and steel establishments was invested in the three states named, against 72.1 percent in 1890 and 62.7 percent in 1880; that these states employed 72.4 percent of the number of wage-earners reported for 1900 for the entire iron and steel industry, against 72.8 percent in 1890 and 59.1 percent in 1880; that they paid these wage-earners in 1900, 75.5 percent of the total wages paid in the United States to workmen engaged in the manufacture of iron and steel, against 76.2 percent in 1890 and 64.7 percent in 1880; that they paid for materials in 1900, 79.7 percent of the total cost reported by all iron and steel establishments, against 77.9 percent in 1890 and 68.6 percent in 1880; and that the value of the iron and steel products manufactured within their borders amounted in 1900 to 78.8 percent of the total value reported for the country at large, against 77 percent in 1890 and 67.8 percent in 1880.

The ever increasing consumptive powers of the United States for iron and steel, and the phenomenal growth of the industry as a whole during the last 30 years, are most strikingly shown by comparing the production of 1900 with that of 1870. In the former year the production of iron and steel amounted to 29,507,860 gross tons, while in the latter year it amounted to only 3,263,585 tons, an increase during the 30 years under review of 26,244,275 tons, or 804.2 percent. The steady growth of the industry by decades is also forcibly shown by comparing the figures for each of the census periods.

In 1870 the total production of iron and steel amounted to 3,263,585 gross tons; in 1880 it had grown to 6,486,733 tons, an increase of 3,223,148 tons, or 98.8 percent; in 1890 it had jumped to 16,264,478 tons, an increase of 9,777,745 tons, or 150.7 percent; and in 1900 it had reached the unprecedented total of 29,507,860 tons, an increase of 13,243,382 tons, or 81.4 percent. In other words, notwithstanding the fact that the production of 1890 was of very large proportions, representing as it did an increase over 1880 of one and one-half times the output of that year, the increase in the production of 1900 over 1890 was over three-fourths of the total production of the year last named. This is indeed a remarkable showing for the closing year of the nineteenth century.

But coexistent with the phenomenal growth of the iron and steel industry from 1870 to 1900, there was a still more wonderful decrease in the cost to consumers of all iron and steel products. The installation at modern plants of the latest labor-saving machinery, the employment of highly skilled managers and workmen, and the ever increasing demand for iron and steel products have all tended to lower the price of finished materials to consumers. Thirty years ago the average price

per ton of the 3,263,585 tons of products was $63.49; ten years later, in 1880, when the production amounted to 6,486,733 tons, the average price was $45.70 per ton; in 1890, ten years ago, when the production had grown to 16,264,478 tons, it was $29.43 per ton; and in 1900, a year of high prices and of great prosperity, when the production reached the enormous total of 29,507,860 tons, the average price per ton had fallen to $27.25, considerably less than one-half the price prevailing 30 years ago, and less than two-thirds of the price realized 20 years ago.

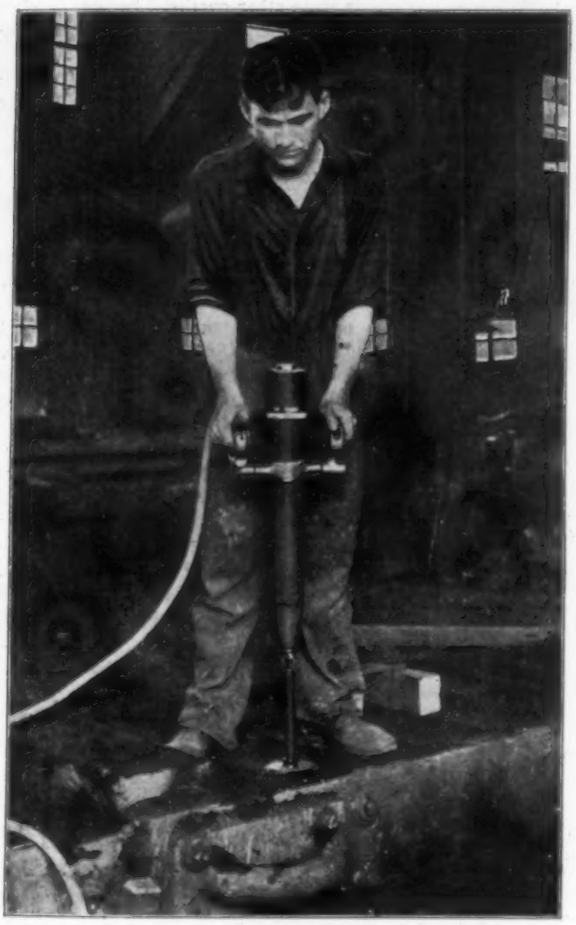
THE FOUNDRYMEN'S ASSOCIATION.

The September meeting of the Foundrymen's Association was held at the Manufacturers' Club, Philadelphia, Wednesday evening, Sept. 3. The following were present: Thos. I. Rankin, Abram Cox Stove Co., Philadelphia; Thos. P. Harkins, Harkins Foundry, Bristol, Pa.; H. O. Evans, Thos. Devlin & Co., Philadelphia; Geo. C. Davis, Dr. E. E. Brown, and C. R. Brown, E. E. Brown & Co., Philadelphia; Frederick Spoerl, H. W. Butterworth & Son Co., Philadelphia; Edwin Cross, Standard Steel Works, Burnham Pa.; W. P. Cunningham, A. & P. Roberts Co., Pencoyd, Pa.; T. J. Kelley, Thomas Roberts, Stevenson Co., Philadelphia; Thos. Bullock, Edwin Macneir, I. H. Webster, T. L. Tierney, Julius Keller, and Wm. H. and Harry Keller, Philadelphia Pneumatic Tool Co.; C. R. Hewitt, Boston; J. Hanthorn, Wm. Sellers & Co., Philadelphia; Owen Brooks, T. B. Smith, Diamond Drill & Machine Co., Birdsboro, Pa.; M. H. Bickley, Penn Steel Castings Co., Chester, Pa.; Robt. Stinson, Jr., Delaware River I. S. B. & E. Works, Chester, Pa.; Jas. B. Strain, Robt. Wetherill & Co., Chester, Pa.; G. M. Thompson, P. D. Harton Machine Co., Philadelphia; Guyon Miller, Downingtown Mfg. Co., Downingtown, Pa.; Oregon J. Ward, Howe Scale Co., Philadelphia; Paul Vanfleet, I. A. Sheppard & Co., Philadelphia; C. L. Taylor, Phoenix Iron Works, Hartford, Conn.; Thos. Devlin, Thos. Devlin & Co., Philadelphia; Adam C. Harper, Penn Steel Casting Co., Chester, Pa.; J. Henry Pepper, *The Iron Trade Review*, Philadelphia; Thos. Hobson and A. A. Miller, *Iron Age*, Philadelphia; J. Thompson, J. Thompson & Co., Philadelphia; Howard Evans, J. S. Hibbs, and A. G. Warren, J. W. Paxson Co., Philadelphia.

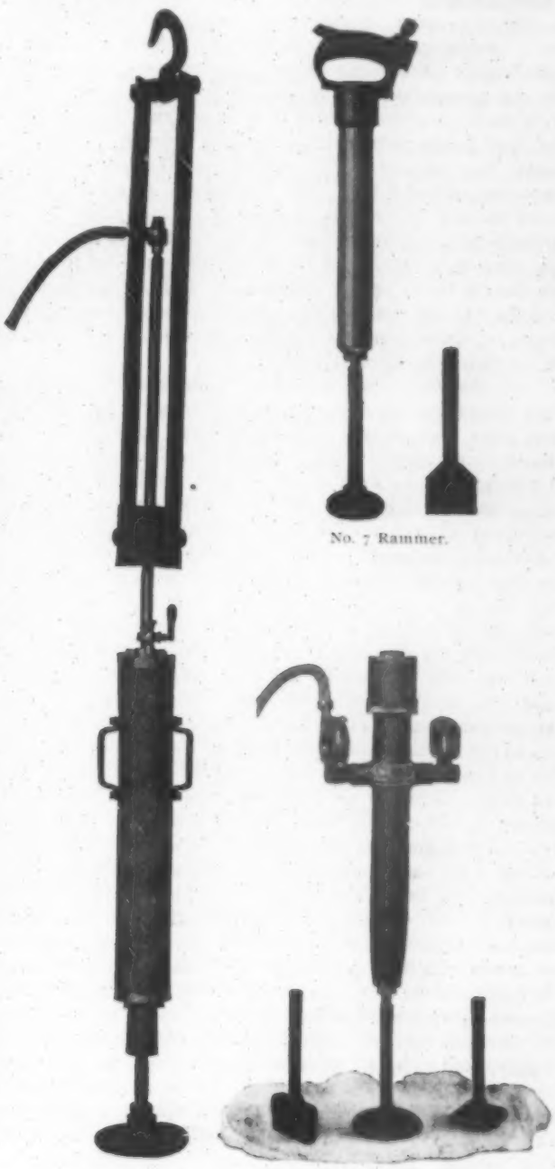
Adam C. Harper, of Chester, Pa., read a paper on the "Keller Pneumatic Foundry Rammers and Air Appliances," which was illustrated with a number of screen projections of lantern slides. We present a synopsis of the address below:

The Keller pneumatic rammers, manufactured by the Philadelphia Pneumatic Tool Co., are the invention of Julius Keller, superintendent and engineer of the company. The rammer is probably the best known and most widely employed foundry appliance actuated by compressed air, being used principally on large molds, foundry pits and loam work. It does the work of from four to eight men in general foundry work, and in some cases has done the work of eight to twelve men in ingots, armor plates and pits. There are three sizes of the Keller Rammers—No. 7, No. 8, and No. 9.

The No. 7, the smallest rammer for general foundry work, is intended for ramming up flasks, pein ramming on large work, cutting out large cores, ramming concrete and tamping. It can be used with one hand, the air supply being regulated in the handle by a lever, giving the workman complete control of its operation. It is so proportioned that there is very



No. 8 Machine in Use.



No. 9 Rammer.

No. 7 Rammer.

No. 8 Rammer.

THE KEELER PNEUMATIC RAMMER.

little jar while it is in operation, the vibration of the moving parts being absorbed to a large extent by the weight of the machine. The valve and piston are entirely enclosed. The rammer rod is hexagon in shape, so that it cannot turn except at the will of the operator. This tool weighs about 18 pounds, and while in operation sustains its own weight. It strikes from 350 to 500 blows per minute, using air at from 60 to 100 pounds pressure, and uses eleven cubic feet per minute. The blow of the workman would not average over 40 pounds. The rammer blows are extremely rapid and can be regulated to the exact degree of force required, and once regulated, do not vary. In consequence, a mold can be so compactly and uniformly rammed that no straining can take place when the molten metal is introduced. A further advantage is derived in that an accurate estimate of the amount of metal required for a casting can be made beforehand. After a molder is ramming for a little while he soon becomes tired and his blows are not so many and not so powerful. There is naturally a wide variation in the force of their blows, and in consequence the mold is not rammed to a uniform firmness. When the metal for the casting is poured in, the walls of the mold are subjected to a very considerable pressure and the metal spreads or "strains." This, of course, alters the intended shape, size and weight of the casting and necessitates the chipping or turning off of the superfluous metal to reduce the casting to its proper dimensions. It has been found in practice that the straining does take place to a greater or less extent in almost every casting, the mold for which is rammed by the above described process.

I can remember a case in point: I spent five days in making some moulds for the steps of a large building. There were on them very deep flanges, and, in fact the molds were very flimsily constructed. I can remember how, on the afternoon of the day that we were to cast them, I had lifted off all the copes, that we might place the cores in the same for castings, as I could not well put the cores in when molding, since they might draw dampness. Two other men were further up in the shop steadily ramming all day on some plain copes 8 feet by 8 feet by 12 inches deep, and after they would finish ramming up one and get it ready to turn over to finish it, they would heek the traveling crane to it and swing it down the shop just over my molds. The first three they rammed all right, but on the fourth they began to get tired and their blows became weaker and weaker. When they hoisted this one up and the traveling crane was bringing it down over the shop, just as it was passing over my molds, the cope began to drop and drop, and before we could get it out of the way, it had already spoiled all the work I could replace in three days. You can imagine what the foreman said when he came along and saw what had happened. He was not ready to hold a prayer-meeting. We have these rammers working in many of the foundries of our country and in Europe. Here are some of the practical demonstrations made by our Mr. Bullock in the last few weeks with this rammer: At the Builders' Iron Foundry, Providence, R. I., a cope 19 feet by 7 feet, 15 inches deep, was rammed up in one hour and thirty minutes. Mr. McGreer, the foreman, said he would be satisfied if a man and two helpers could ram up the same in eight hours, as they have never done it yet on the same cope. At the Warren Foundry & Machine Co., Phillipsburg, N. J., with this No. 7 rammer, a cope 6 feet by 6 feet and 8 inches deep, was rammed up in eight minutes, the foreman in charge of this shop admitting that he could not ram it up in less than 30 to 40 minutes. Our next proposition in the same shop was a cope 15 feet long, 2 feet 6 inches wide and 16 inches deep. We rammed it up in 27 minutes, while it takes a molder and two helpers two hours to complete the same. At A. S. Cameron's Pump Works, New York, a cope 6 feet by 3 feet and 6 inches deep, was rammed up in three minutes against twenty minutes by hand. At Wm. Sellers & Co., very peculiar piece was rammed up by us with this rammer in three hours, while it takes their leading molder nine hours. At Cramps' shipyard two rammers in a pit do the work of 30 men, in shorter time than hand ramming, and they never use curbings any more below the level of the floor, as the ramming by this process is hard enough. The Pusey & Jones foundry some time ago, with this No. 7 rammer, rammed up a paper dryer mold 15 feet long on end, in seven hours with three helpers against five molders and five helpers in five hours, or, in other words, 28 hours was the time for two rammers and three helpers as against 50 hours for five molders and five helpers with the hand system of ramming. There were many tests made at the Bethlehem Steel Co. on armor plates. We are now prepared to do with two of these rammers and four helpers, six men in all, in 14 hours each, what ten men can do on the same work in 30 hours each.

Next we come to our No. 8 rammer. This machine is provided with a handle on each side. To the handle on the right side is attached the air supply hose, and the admission of air to the cylinder of the rammer is controlled by means of a throttle lever under the thumb of the user. The exhaust air passes out through the handle on the opposite side. The speed and force of the blows may be varied at the will of the user. A number of different shaped rammer butts are provided with each machine. They are attached to the rammer rod by means of a taper fit and may be changed in less than one-half minute without letting go of the handles. Besides regular foundry work, it has been found to be a labor-saver in ramming up converter bottoms in Bessemer steel plants, tamping concrete road beds, etc.

The No. 9 rammer, which is especially designed for heavy work, where a crane or some other overhead support is available, is especially adapted for large loam work, pit ramming, etc. This rammer will do the work of 12 or 15 men with the old style hand ramming.

All our rammers are well out of the experimental stage. Several years of actual service in the most progressive foundries in the world demonstrates conclusively that the pneumatic rammer has come to stay and must be considered a highly important part of the equipment of the modern foundry. On a general line of work we have demonstrated a saving from 30 to 85 percent in the cost of molding.

The American Machinery & Export Co., of 120 Liberty St., has secured a contract from Japan calling for a quantity of pneumatic tools, including drillers, caulkers, riveters, chippers, etc., for installation in the Kure dockyards. This contract has not yet been sublet. From Manila an order has been secured for 100 sets of railroad trucks, several turntables, circular saws, etc. The trucks will be built in Europe, owing to better delivery being secured on the other side. The Northern Engineering Works, of Detroit, Mich., will furnish the turntables.

The Alfred Dimmack Mfg. Co. has been formed at Wheeling, W. Va., with works at 2406-2408 Chapline St., to manufacture steel and wrought iron specialties—links, rings, hooks, hasps, staples, washers, etc.

At Pittsburg the new Iron City Spring Co. has increased its capital stock to $500,000. The company will manufacture steel springs for railroad purposes on a large scale. The board of directors is composed of D. C. Noble, James Neale, T. Hart Given, Leroy C. Noble, Henry Aiken, Thornton N. Motley, and H. K. Porter. D. C. Noble is president, W. H. Gardner assistant secretary and George W. Little assistant treasurer.

A discovery of iron ore which promises to be important has been made in the eastern part of the Mesabi range by Marvin Van Buskirk, of Eveleth, who has associated with him in financial interest John McGreevy, the Eaton brothers, Charles Purden, of Duluth; A. G. Jones, of Mountain Iron, Mich.; D. L. Fairchild, of the United States Steel Co.; A. B. Coates, W. J. Moore, Jacob Stein, and E. J. O'Rourke, Virginia. A description of the land on which the ore is found is the north half of the southeast quarter and the north half of the southwest quarter of section 4, 58-15. The ore shown up so far is on the east forty, which is about one-half mile southwest of the Meadow mine and two miles south of the Stephenson mine. Ore was sunk in the first hole that was struck and four more holes have since gone down with the same result. The drilling done on the property up to the present time has proven up more than a million tons of ore. The physical qualities of the ore are said to be very satisfactory. Analyses average 62 percent iron, but are a little high in phosphorus.

A NEW FORM OF INGOT MOLD.

While ingot molds for Bessemer and open-hearth castings are simply square, slightly tapering, tubes with bottoms in a separate casting and removed from the ingot by drawing them off endwise; the smaller ingot molds for crucible steel castings have generally been made in separable halves usually parted flatwise, tongued and grooved together, with a bottom cast in each half and removable by opening off the mold. See Fig. 1. As the two halves have to be cast from different patterns and planed separately, it is quite difficult and practically impossible under ordinary conditions to keep the patterns from warping and so to conduct the planing that the two halves will match accurately, the result being that the ingots cast in such molds are more or less uneven on the sides and show fins. The presence of these fins renders it necessary to do considerable chipping to prevent seams and streaks in the finished product.

Some fifteen years ago ingot molds made for the Sanderson Brothers' Steel Co., Syracuse, N. Y., had the two halves

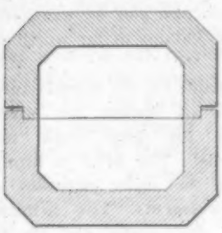


FIG. 1.

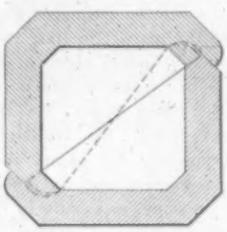


FIG. 2.

cast at once, and while still red they were clamped together and cooled so as to secure a fit without machining. At this time the work was done at the Straight Line Engine Works, and John E. Sweet carried out an idea he had long had in mind—that the correct method was to part the mold at the corners and make the joints as shown in Fig. 2. The halves were located endwise by halving at the bottom as shown by the dotted line. This not only put the fin (which was pretty sure to exist where the two halves came together) on the corner where it was more easily removed, but put the joint in a much better form for cleaning off the sand before closing, which was always an unsatisfactory job at the best. A couple of patterns were made and several molds made from them, but others offered better terms and the engine company had no occasion to follow it up. The plan of putting the molds together in the foundry was abandoned, and planing the joint so as to secure a better fit, as had always been done by others, was adopted.

The making of the molds was again taken up by the engine company and Mr. Sweet improved his plan and settled on the form shown in Figs. 3 and 4. The object of parting on the corners has been explained, but the method of joining possesses

FIG. 3.

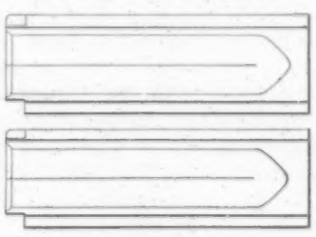


FIG. 4.

the advantage that the two halves can be made from one pattern, and if the pattern warps it makes no difference, as the two halves will be alike and will match up at the joint inside, and hence produce ingots free from fins.

Another feature shown is that of locating the two halves endwise. This is done by a lug on each half at the top, engaging with a recess on the opposite side of the other half as in Fig. 4. These lugs and recesses being outside of those parts that make the joint do not interfere with the planing; hence the two halves are put upon the planer and planed at once, insuring a perfect fit. The cast ingot is more perfect and the mold is made at a reduced cost. This improvement is the subject of a patent recently allowed President Sweet, of the Straight Line Engine Co.

LAKE SUPERIOR IRON MINES.

The Commodore mine, the Virginia property of Corrigan, McKinney & Co., will probably be reopened at an early date.

Pickands, Mather & Co., Cleveland, have secured an option on the lease owned by the Elizabeth Iron Co. to lands in section 12, near Hibbing, Minn. The land is owned by the State and is leased to J. P. Morrow, president of the Elizabeth Iron Co.; J. T. Michaud, E. S. Palmer, J. T. Hale and Archie Chisholm, of Duluth, and P. L. Kimberly, of Sharon, Pa. Three of the drill holes are in 330 feet of ore. Pickands, Mather & Co. are now exploring the property, which is near the Penobscot mine.

It is expected that next year the Oliver Iron Mining Co. will make extensive experiments in drying its ore before shipping.

The report that the Chicago, Milwaukee & St. Paul R. R. Co. will erect another dock at Escanaba the coming winter is semi-officially confirmed.

The property of the Elba Mining Co. in Dickinson county, Michigan, has been sold by the receiver, pursuant to a court order, the purchaser being A. L. Flewelling, of Crystal Falls, for Corrigan, McKinney & Co., Cleveland.

What has been known as the Hayes exploration on Sec. 6, 39-29, Menominee range, has been abandoned, the ore found being very lean.

Exploring on the site of the town of Ishpeming, Mich., begun 18 years ago and then stopped by a heavy flow of water, has been resumed by Dr. Kimball, who did the original exploring.

Mine superintendents are manifesting keen interest in the sinking of the sand shaft at the Maas mine, Marquette range, which is proceeding very slowly. It was known to be a difficult job and the management is not discouraged. There is an extensive network of timbers, pipes and ropes near the shaft. It is necessary to adjust the blocks daily, on account of the movement of the sand. The derrick is securely braced and held in position with wire cable. The pipes leading to the shaft are also held with cables, so that when the shaft timbers go down they will not break away. The shaft will be the deepest of its kind in the Lake Superior district.

The American Steel & Wire Co. made export shipments of nearly 8,000 tons of wire and wire nails through New York and other Eastern seaboard ports last month. The wire exports aggregated over 5,000 tons, South Africa, Australia and South America being the largest purchasers. Twenty-eight hundred and sixty-nine tons of wire nails were sent to various foreign countries during August. The Far East was the largest buyer, 1,183 tons going to China and Japan. Seven hundred and six tons constituted the August wire exports to Europe.

At Trenton, N. J., Col. Albert A. Pope, K. Lindsey Coleman and John A. Miller have been appointed receivers for the American Bicycle Co. Col. Pope and Mr. Coleman are officers of the company. The company has defaulted the payment of interest on outstanding bonds amounting to $225,000. The company is said to also owe $150,000 to Baring, Magoun & Co., $50,000 to the Federal Mfg. Co., and $58,000 to Smithers & Co., besides other debts. The company, in addition, owes $9,500,000 as principal on outstanding bonds. The assets are given as $7,751,000, a portion of which, however, is considered of uncertain value. Mr. Coleman says the company is solvent and will be reorganized with increased working capital.

The Southern Supply and Machinery Dealers' Association will hold its annual meeting in Memphis, Tenn., Oct. 21, 22 and 23. The main question to be considered relates to rates on machinery, over which there has been a long fight with the railroads.

The Dunedin (New Zealand) electric traction system is to be built principally with American equipment. The existing lines are at present worked by horses. There is about twenty miles of track, which will be considerably added to. The special rail work will be supplied by the Lorain Steel Co.

THE MARKET FOR BY-PRODUCTS OF COKE MAKING.

BY JOHN F. WILCOX.

The question is frequently asked, Is there no danger, owing to the increased number of new retort oven plants, of over-production of by-products? It is a natural and important question. In the Pittsurg district using Monongahela or Youghiogheny coals the credits per ton of coke from the resultant products of the ovens other than coke are approximately as follows, for the coals named:

Tar	42c	28c
NH_3	70c	63c

The value of the gas is entirely a local matter, depending upon the nearness and wants of consumers, and ranges from nil to 35 cents per ton of coke. Ammonia being the largest factor, its trade conditions are entitled to first consideration. Prior to July, 1896, and including a period from 1883 the only source of supply was either by importation or from gas companies. The price per ton of sulphate f. o. b. New York, ranged from $78 in March, 1894, to $45 in April, 1896. Westphalia being probably the largest district producer, the figures of its production and values are interesting. They are as follows:

	Tons.	Average Price.
1895	10.043	
1896	21.377	£7.18s.
1897	32.418	£7.13s.
1900	49.223	£10.6s.

For 1901 the world's production is estimated as follows:

	Tons.
Great Britain	220,000
Germany	130,000
France	35,000
Belgium	35,000
Austria, Russia, Spain	40,000
United States	60,000
Total	520,000

There is a steady and constant market, at a price, for ammonia sulphate as a nitrogenous fertilizer, filling the same functions as Chilian nitrates and following the latter in fluctuations of price, the difference in contained nitrogen of each (i. e. 21.2% in sulphate and 16.4% in nitrates) being necessarily taken in account. About 1,300,000 tons of Chilian nitrates are produced yearly and no natural substitute in quantities is known. Consequently for a long time in the future it can only be by a depression in the price of the natural product that any downward movement of moment in the price of sulphate can occur.

It is estimated that $35 a ton f. o. b. Liverpool is about the figure at which the production, preparation and freighting of nitrates would cease to be protfiable. This is equivalent to about $46 a ton for sulphate, taking into consideration the increased nitrogen of the latter. There is also a limit to the Chili deposit. A good authority estimates 23 years hence, at the present output of 1,300,000 to 1,400,000 tons annually, as being the time of exhaustion.

While the prospect of increased production of the natural product is steadily lessening, the rapid increase in consumption is noteworthy. At the present time in Germany nearly 160,000 tons of sulphate of ammonia are used for agricultural purposes alone. In addition to this the imports of nitrates in that country in 1900 amounted to 484,543 and in 1901 to 529,568 tons, equivalent to approximately 375,000 and 400,000 tons of sulphate. In the year ending June 30, 1900, 192,321 tons of nitrate, equivalent to 148,000 tons of sulphate, were imported into the United States.

When it is considered that if all of the 23,000,000 tons of coke that is made annually in this country, were made in the by-product oven the total yield of sulphate would hardly exceed 200,000 tons, we can dismiss any idea as to the dearth of market. The prices may fluctuate, there will be good and bad seasons, and there will be ups and downs, as there are in the metal or grain markets, but a long distance 'phone to a New York or Baltimore broker will always make a sale.

As regards the tar conditions, the German and English data regarding production and consumption are meager. The report of the United States Bureau of Statistics compiled by Mr. Phillips (1899) gives the total production of gas house tar at 24,384,798 gallons, for the fiscal year of 1898. During the same year 261,912 tons of retort coke were produced, with an estimated yield of 4,000,000 gallons of tar.

The extended use of water gas plants as well as electric light installation would indicate that no material increase in tar production need be anticipated from gas works.

The production of tar from coke works in recent years has been as follows, and estimates are appended for 1902, 1903 and 1904:

1897	3,500,000	Estimated.
1898	4,000,000	"
1899	10,687,830	Actual.
1900	11,937,448	"
1901	12,695,190	"
1902	14,000,000	Estimated.
1903	24,000,000	"
1904	44,000,000	"

Taking into consideration the new works now under construction and the time that their output will be on the market, the estimated increases will be as shown above, adding to same the estimated gas works production and we will have on the market in 1904 about 75,000,000 gallons of tar worth at today's figures about $1,875,000.

The present output is in steady demand for the manufacture of roofing paper, for the creosoting of lumber, for street pavements, for insulating material, for lamp black, for briquettes, for paints and for solvents. The price is firmly maintained and its consumption for the above purposes is increasing, especially in the use for pavements. The chemical manufacture of aniline colors, salts, etc., using coal tar as raw material, is in its infancy in this country. In 1901 we imported coal tar products to the amount of $6,139,559 exclusive of duty, freight, and other charges. Today we are consuming about 44,000,000 gallons of tar yearly, worth, say, $1,000,000. By the end of 1904 we will have an increase of 31,000,000 gallons worth $775,000.

These figures should be sufficient evidence that the danger from over production is very slight. Assuming, however, that such a condition did exist, coal tar as a fuel always possesses substantial value, a value that is enhanced by the ease with which it is manipulated.

The composition of tar being an exceedingly variable quantity, any statement regarding its calorific value can only be a general one. Coke oven tar can be assumed to possess 16,000 to 17,000 B. T. U. Some careful investigations were made last year by Chas. F. Prichard of the Lynn (Mass.) Gas Co. looking to the fuel value of residuals. His conclusions give tar a direct value as compared with gas house coal, of 14 lbs. of water evaporated to 10 lbs. with coal—this under a multitubular boiler with ordinary settings. This cannot be accepted as a commercial ratio, as no account is taken of incidental expenses of handling, ashes, etc. A fair fuel value of the tar in its relation to coke can be expressed by saying that for every ton of coke made the tar produced will be equivalent as fuel to 1-10 to ⅛ ton of coal.

On the "Treatment of Steel."

We have received an advance copy of the third edition of the "Treatment of Steel" from the publication department, 85 Elm St., New York, of the Crucible Steel Co. of America. This book was originally issued by one of the subsidiary companies and the present edition has been remodeled and revised. Among the additions we note a new introduction, new engravings, a single and double plate showing the effects of heat upon steel, some foot-notes explanatory of the text, a new chapter on self hardening steel, some additions to paragraphs under the heading "Sparks," and best of all a copious index which is particularly valuable in opening up about 100 pages of a chapter on "Hardening and Tempering Steel," which hitherto has been in some respects unavailable. The book is well bound in blue cloth and contains 160 5x7 pages.

The city of Philadelphia has decided to use gas engines in its new high pressure fire service pumping station. There will be installed seven 280-horsepower and two 125-horsepower gas engines. They will exert a maximum pressure of 300 pounds per square inch, a pressure sufficient to throw a stream of water over the highest building.

TRADE PUBLICATIONS.

The latest catalogue of the Lunkenheimer Co., of Cincinnati, covers an unusually wide range of brass and iron specialties as well as standard engineering appliances. The work extends to some 210 5x7 pages and is extensively illustrated with engravings of steam fittings, etc. In view of the variety shown in this publication it is interesting to learn that with one or two exceptions all the goods mentioned are wholly manufactured by the Lunkenheimer Co.

The catalogue of the Franklin Machine Works, of Philadelphia, is devoted to horizontal floor boring, milling and drilling machines, cold saw cutting-off machines and plain milling machines. The line of machinery is neatly illustrated and the catalogue bears on the cover an elaborate color design.

The injectors and ejectors made by the Hayden & Derby Co., of New York, are described at length in a recent catalogue, together with a variety of other jet apparatus. The catalogue is standard size 6x9, and contains considerable information on the results attainable under the various conditions found in practice. The illustrations include some excellent halftones and the descriptions are attractively displayed.

The Robert Aitchison Perforated Metal Co., of Chicago, has issued a 5x7 catalogue of its products. These are of a varied type, the company having a complement of dies amounting to over 600 sizes and shapes of perforations. The list of patrons runs through a long line of industries utilizing perforated metal, from flour mill equipment to vapor stoves.

The C. C. Wormer Machinery Co., of Detroit, Mich., has prepared a catalogue and price list known as No. 25. It treats of power transmitting machinery and extends to 52 pages 5½x7½ inches. The subject matter mainly refers to patent steel shafting, wood split pulleys, drop hangers and floor stands, friction clutch couplings and pulleys. The firm also handles a line of general machinery comprising machine tools as well as wood working machinery.

An eight-page circular tells of the equipment handled by the firm of Charles E. Stamp & Co., of Cleveland. The company is selling agent for a general line of machinery for rolling mills, steel plants, iron and steel foundries as well as electric lighting and power equipment.

Kay Dyhr, the agent at Copenhagen, Denmark, of the American Air Compressor Works, New York, has prepared a small pamphlet in Danish of the air lift pumping system, the American air compressors and governors and the direct acting air compressor manufactured by the Union Steam Pump Co.

The reamers and combination tool holders manufactured by McCrosky & Huber, of Cincinnati, are given attention in a brief catalogue. The reamers are of the universally adjustable type and the tool holders illustrated are made on substantial and simple lines.

The September and October stock list sent out by the Scully Steel & Iron Co., of Chicago, has been increased over the former issues by the addition of a line of pneumatic riveters for tanks, trucks, girders and bridges, and the Wangler rotary beveler recently described in these columns.

A short story of Sir Henry Bessemer adds another to the interesting list of biographical sketches published by Messrs. Wyman & Gordon, of Worcester, Mass. These booklets are admirable accounts of the sturdy pioneers of industry and the present installment is well up to the level of the previous publications. A couple of pages are given to the drop forging business of the firm.

"Klein's Combination Classifier" is the title of a small pamphlet issued by the Allis-Chalmers Co., of Chicago, and descriptive of a special system of ore concentration. This classifier embodies a new principle, namely, the use of compressed air with the water to effect the sizing and thus greatly reduce the quantity of water ordinarily required in this work.

Several circulars have been received from the Fort Wayne Electric Works, of Fort Wayne, Ind. These describe single phase generators, direct current belted motors, direct current belted generators, the "Wood" cut-out for arc circuits, and a testimonial to the working condition of a 30-light transformer after being struck by lightning.

The 24-inch and 18-inch semi-automatic turret lathes manufactured by the American Turret Lathe Mfg. Co., of Warren, Pa., are illustrated with a brief description in 6x9 circulars. The 24-inch machine swings 27 inches for a distance of 12 inches from the chuck and the 18-inch lathe swings 22 inches for a distance of 8 inches from the chuck.

The Northern Electrical Mfg. Co., of Madison, Wis., has reprinted Bulletin No. 24 which will be known as No. 29. The new publication contains eight additional pages and many new illustrations, and serves in a more complete manner to show the variety and quality of "Northern" apparatus.

OBITUARY.

George Alfred Bell, treasurer of the Marion Malleable Iron Works, Marion, Ind., died very suddenly at his office on Tuesday afternoon, Aug. 26. He had been in usual health up to the day of his death. The deceased was born at Brooklyn, N. Y., Sept. 6, 1851. He was educated in the public schools of Brooklyn and at the Brooklyn Polytechnic Institute. After graduation at the latter he spent some time in Europe and subsequently entered the employment of the Pratt Oil Works and was with this concern at the time of its absorption by the Standard Oil Co. With the Standard Oil Co. he held various positions of trust and in 1886 severed his connection with the company to become auditor of the Troy Steel & Iron Co., at Troy, N. Y. He was successively auditor, general superintendent and general manager of the Troy Steel & Iron Co. and upon the organization of the Troy Steel Co. became vice president and general manager of the new concern which position he held until August, 1900. His connection with the malleable business dates from that time. During his connection with the steel works at Troy, Mr. Bell became an expert metallurgist and had few peers in this line.

Samuel Washburn Sessions, president of the Lamson-Sessions Co., Cleveland, which manufactures bolts, nuts and rivets, died Sunday, Sept. 7, aged 76. Mr. Sessions was a native of Connecticut and was employed for 10 years before coming to Cleveland by the company of which he afterwards became president. He went to Cleveland 30 years ago with that concern, which was moved from Mt. Carmel, Ct. He was also a director of the Union Rolling Mill Co.

William Henry Pickering, head of the firm of W. H. Pickering & Co., of Hartford, Conn., engine builders, died at his home at the latter place on Tuesday, September 2, at the age of 55 years. Deceased founded the firm which bore his name in 1883, and in recent years all the outside stockholders disposed of their stock to him, so that at the time of his death he was the sole owner of the company's property. He is survived by his wife and four children.

New Rolling Mill at Elyria.

The contract for erecting the new rolling mill plant of the Columbia Steel Co., at Elyria, O., has been awarded to Fred Wolf, of Elyria, for $51,000. The plans, drawn by the Walter P. Rice Engineering Co., Cleveland, show that the main building will be of unusually ornate appearance for a structure of that kind, the architecture being the old Spanish, with tile roofing. The main building will be 400x80 feet, and will include the office building, storage room, cold rolling mill, furnace room, and the shipping room, the last named being an L, 60x80 feet, in the rear. Separate buildings will be the boiler room 60x80, the engine room 50x60, the pickling room 50x70, and the coal shed 20x80. Special pains have been taken to provide ample light. The plant is admirably located for shipping purposes near the Lake Shore and B. & O. railroads. It is expected that the mill will be in operation within six months.

James Israel, secretary and treasurer of the Mt. Vernon Bridge Co., has been appointed receiver of the Coxey Steel plant, of Mt. Vernon, O., and the Coxey Silica Sand Co., of Massillon, both owned by J. S. Coxey, of Mt. Vernon. The appointment of the receiver was made on the application of the Fourth National Bank of Cadiz, alleging that a judgment was taken against the above company in the sum of $5,041.60 on April 7, 1902, and that the money could never be obtained. Coxey was the leader of the "Commonweal" army which marched to Washington in 1894.

BRITISH IRON MARKET AND AMERICAN DEMAND.

In the pig iron branch there is a fair demand, and a firm tone; but some classes of manufactured material remain depressed, although, on the whole, there is a moderate business doing. The pig iron market still finds strong support in the demand from the United States for Cleveland and Scotch qualities. There can be no doubt that this demand has been the chief cause of the recent rise in prices, both in the North of England and in Scotland, and that, while it continues, there is not likely to be any weakening of the market. The condition and prospects of trade in the United States at the present time, therefore, are of considerable importance to British producers of pig iron. It would seem that there is some improvement in the coal and coke movement in the States, now, although it is still bad; but pig has been increased in price, and only small lots are available for sale. It appears likely, however, that the scarcity will only last a few months, although foundry iron is likely to remain in short supply when other kinds have become more plentiful. British producers of this quality, therefore, may reasonably expect a continuance of American orders for some months to come, at any rate. The Continental markets show little animation at present. There is, however, a moderate amount of work in hand, and an early improvement is expected.

PIR IRON.—The strong tone which we have had occasion to chronicle as characterizing the pig iron market during the past few weeks still remains, and in some cases has become accentuated during the past week, largely, as we have noted above, owing to the continuance of enquiries and orders from the other side of the Atlantic. The business done in Cleveland foundry qualities is satisfactory, and, with but meager supplies available, prices have been well maintained all round. The stock of No. 3 is now remarkably small, and the average figure realized during the week has been about 52s. 6d., the price quoted on Thursday of last week, and it is reported that some makers are now getting 3d. more. There is no improvement, however, in the hematite trade on the East Coast, and with mixed numbers selling at 57s., the profits of producers have dwindled to vanishing point. West Coast makers are getting about 5s. per ton more, their prices having been advanced 1s. this week, as a result of the increased demand from steelmakers. On the Glasgow warrant market a good business is being done, and on Wednesday no less than 30,000 tons changed hands. The following is our usual statement of stocks for the week ended Aug. 26:

Public stores stock in ton.	Wednesday.
Connal's at Glasgow	43,200
Connal's at Middlesbrough	128,900
Connal's at Middlesbrough, hematite	300
West Coast hematite	24,000
N. E. R. Stores, Middlesbrough	

There has been an increase on the week of 2,745 tons, and a decrease on the year to date of 14,800 tons.

MANUFACTURED IRON AND STEEL.—The position of manufacturers of finished materials at the present moment is hardly so satisfactory as that of pig iron producers. They have not the same American demand to help them, for although some orders for shipbuilding materials are said to have reached Scotland from New York, no very reliable information is available concerning them. Indeed, the buying from the States has rather helped to make the position of some producers of finished iron and steel more difficult than to improve or ameliorate it. In the case of the Cleveland mills producing plates, angles, and other shipbuilding material, for instance, orders are now running short, and there is little fresh business coming forward. And yet, with pig prices at their present level, makers can hardly afford to make any reduction in their rates with the view of tempting buyers, especially having regard to the increased quotations for fuel, which are based upon those for pig iron. But although marine material is not in very brisk request just now, other departments are more favorably situated. Steel rails are in good demand, and heavy sections command £5 10s., while there is a healthy trade doing in iron bars, which in South Staffordshire realize £8 10s. in the case of branded iron, and £6 15s. to £7 for common qualities. In the same district boiler plates are selling at £9 10s. for ordinary qualities, and up to £12 for special makes. Tank iron is at £8 to £9, and angles at £7 10s. to £9. Black sheet enquiries are reported under £8, but manufacturers are unwilling to accept anything below that figure. For best sheets the price ranges from £10 10s. and £11. Angles and channels are in good request for car building.

COMPARISON OF PRICES.—Prices are as follows, compared with those in the week and year previous:

COMPARISON OF PRICES.

	Aug. 28, 1902.	Aug. 21, 1902.	Aug. 29, 1901.
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	16 0	16 0	15 9
" Cardiff	14 3	14 3	14 6
Pottery Mine, North Staffordshire	20 6	20 6	20 6
Hematite, West Coast (at mines)	16 0	16 0	16 6
PIG-IRON—			
No. 3 foundry, Middlesbrough	52 9	52 6	45 3
Warrants,	52 10½	52 9	44 10½
Scotch warrants, Glasgow	57 6½	57 6	53 6
Hematite warrants, West Coast	60 11	60 3	61 0
Cold blast (foundry), South Staffordshire	105 0	105 0	103 0
Welsh hematite, Cardiff	63 0	63 0	60 6
MANUFACTURED IRON & STEEL—	£ s. d.	£ s. d.	£ s. d.
Marked bars, South Staffordshire	8 10 0	8 10 0	8 10 0
Common bars "	6 15 0	6 15 0	7 5 0
Steel rails, Middlesbrough	5 10 0	5 10 0	5 10 0
" West Coast	5 10 0	5 10 0	5 5 0
" Cardiff	5 10 6	5 10 0	5 15 0
Steel angles (eng.), Middlesbrough	5 17 6	5 17 6	6 2 6
" " Glasgow	5 12 6	5 10 0	5 15 0
Steel plates (ship), Middlesbrough	5 15 0	5 15 0	6 7 6
" " Glasgow	6 0 0	5 17 6	6 2 6
" (boiler) Glasgow	6 7 6	6 5 0	6 17 6
Tinplates, Bessemer I. C. cokes, South Wales	s. d.	s. d.	s. d.
	13 3	13 3	15 3

—[London Iron and Coal Trades Review, Aug. 29.

The Valley Iron Co. Organized.

A blast furnace will be erected by the Valley Iron Co. on the property on the Queen & Crescent R. R. between Chattanooga and Birmingham. Coal mines will be opened and coke ovens erected. The stockholders have elected the following directors: Archer Brown, of New York, chairman of the Empire Steel & Iron Co.; H. A. Marting, of Ironton, O., of the Marting Steel & Iron Co.; J. G. Battelle, of Columbus, O., vice president of the Columbus Iron & Steel Co.; J. A. Andrews, of Newport, Ky., president of the Newport Rolling Mill Co.; James Bowron, of Birmingham, Ala., formerly treasurer of the Tennessee Coal, Iron & Railroad Co.; James L. Gaines, of Nashville, formerly assistant general manager of the Tennessee Coal, Iron & Railroad Co. in Tennessee; G. B. McCormick, vice president of the Woodward Iron Co.; Erskine Ramsay, of Birmingham-Ensley, proprietor of the Bank of Ensley, and Charles A. Stillman, of Birmingham, resident manager of Rogers, Brown & Co. The following officers have been elected: J. G. Battelle, president; Erskine Ramsay, vice president; J. F. Steins, Wheeling, W. Va., secretary-treasurer, and Charles E. Bowron, general superintendent.

At a meeting of the board of directors it was decided to erect a blast furnace so that operations can be commenced about January, 1904. Plans will be prepared for the erection of two stacks, but for the present only one stack will be erected. The coal and ore properties owned by the company are 13,700 acres of land in Dale, Georgia and DeKalb counties, Ala. The mineral lands lie in a strip one and one-half miles wide and ten miles long, paralleling the Great Southern Railroad. In the center of this property the blast furnaces will be erected. The coal property has already been opened up and 300 bee hive oven will be erected immediately, the coal being excellent for coking purposes. The ore on the property has the same physical structure and analysis as the Red Mountain product in the Birmingham district. The furnaces will be the only ones in Alabama where the coal, coke and ore can be laid down at the stacks without the use of railroads for at leasts a short haul of some one of the raw materials. The plans provide for thoroughly modern furnaces.

The Southern Supply and Machinery Dealers' Association will hold its annual meeting at Memphis, Tenn., on Oct. 21, 22 and 23. The main question that will come up for consideration will relate to freight tariffs on machinery and machine supplies. It is claimed by officials of the organization that they are charged higher rates than are charged by Northern roads for the transportation of similar products. An effort will be made to have the railroads readjust their rates.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in commnnication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

Howard Abbott, until recently superintendent of the James Leffel Water Wheel Co., Springfield, O., is organizing a company for the manufacture of automobiles. The capital is to be $600,000, of which over two-thirds, it is said, has been subscribed.

John Denham, electrical engineer of the Cape Government railways, Cape Town, South Africa, is reported to be desirous of securing catalogues, with prices, discounts, etc., of engines, steam, oil and gas, direct coupled sets, alternating and continuous, direct current and alternating motors, boilers, feed heaters, cooling towers, condensers, pumps, steam piping, electrical cranes, cables and wire, also underground conductors for high voltage, arc and incandescent lamps, meters, accumulators, electric fittings, switchboards, measuring instruments, etc. Where prices are subject to market fluctuations an approximate amount should be stated.

The Lumberman's Tool Co., South Boardman, Mich., is in the market for machinery, boilers and engines for the company's new plant. The manager is George S. Burleson, Cedar Springs, Mich.

The Stowell Mfg. & Foundry Co., South Milwaukee, Wis., has increased its capital stock from $175,000 to $200,000. The company has just completed a new malleable foundry, 80x200 feet, and made other improvements.

The recent increase of capital of the Boley Wire Fence Co., of Sandusky, O., was made necessary by the rapid growth of the business of the company. Additional machinery will be put in.

The Schneider Machinery Co., of Cleveland, has been incorporated with a capital of $25,000 by Peter Schneider, A. A. Clay, Ward Stager, E. M. Hain and C. W. Diehl. The company will carry on the business heretofore conducted by Mr. Schneider.

The Morse Power Co. of Chicago, has been incorporated with $10,000 capital for the purpose of manufacturing and installing steam appliances. A. M. Morse, A. S. Morse and W. R. Chamberlain are the incorporators.

The American Insulated Wire & Cable Co., recently incorporated under the laws of the State of New Jersey, has leased a factory building at Stamford, Conn., for a period of three years. The plant will be equipped immediately with machinery for the manufacture of insulated wire and cables.

The Stamford Engine & Machine Co. of Stamford, Conn., which was recently organized has leased an abandoned factory building and will equip the same for the erection of the Bert Merry engine, the sole right for the manufacture of the same having been secured by the company.

The Cambria Foundry & Machine Co., Johnstown, Pa., has increased its capital from $50,000 to $150,000. The increased capitalization is to be used in the erection of an entirely new plant. The present plant has a daily output of 50 dozens of shovels daily, while an output of 200 dozens is required to meet the big demand for the company's product. The site has not yet been selected, although three or four are under consideration. The officers of the company are as follows: John Horn, president; George A. Hager, treasurer; H. M. Benshoff, secretary. These officials, together with N. B. Griffith and A. J. Gairing, compose the board of directors.

The Burlington Brass Works, of Burlington, Wis., has been incorporated with $10,000 capital for the purpose of erecting and operating a brass foundry. G. C. Rasch, O. O. Storle and J. P. Gill are the incorporators.

The Stowell Manufacturing & Foundry Co., of South Milwaukee, Wis., has increased its capitalization from $175,000 to $200,000.

The Lawrence Iron Co., of Duluth, Minn., has been incorporated with $75,000 capital by James Cargill, John Collier and C. A. Munro.

Architect Harry W. Chamberlain of Detroit, Mich., is preparing plans for the erection of a new foundry at Detroit. At present the name of the company is withheld.

The Athens Foundry and the Bailess Foundry & Machine Works, Athens, Ga., have consolidated and the new concern will be known as the Athens Foundry & Machine Works. The company is capitalized at $50,000.

The Ensign Foundry Co. has been organized at Toledo, O., with $50,000 capital for the purpose of erecting and operating a gray iron foundry. F. H. Ensign, John Stollberg, C. W. Rushing, D. R. McChesney and Lawrence Raab are the incorporators.

The Universal Iron Foundry Co., of Brooklyn, N. Y., has been incorporated with $35,000 capital for the purpose of operating a gray iron foundry. Phillip Schwickart, C. B. Nagel and Herman Schwickart are the incorporators.

The Spray Washing Machine & Manufacturing Co. has been organized at Baltimore, Md., and has been capitalized at $50,000. The company will erect a factory for the manufacture of spraying machines, and will have an extensive warehouse. H. S. Sohl, W. H. Waddell, W. H. Radcliffe, G. P. Hopkins and H. S. Abendscheim are the incorporators.

New Construction:

The Toledo Railways & Light Co., Toledo, O., has let the contract for the erection of the new car shops in that city, which will cost $60,000. The machine shop, 100x250 feet, will first be built and other buildings later.

The Withington Cooley Mfg. Co., Jackson, Mich., has purchased a two-acre tract at Findlay, O., and will establish a large handle factory. The company will move its Huntington, Ind., equipment to Findlay.

The Pennsylvania R. R. Co. will build a brick one-story machine shop, 265x60 feet, at its Altoona, Pa., shops.

The Elwood Boiler Co., Anderson, Ind., will erect large additions to its plant this fall.

The Chas. McCaul Co., Philadelphia, has contracted for the erection of a new two-story machine shop, which will cost $18,000.

Plans are being prepared for the new building to be erected at Fredericksburg, Va., in place of the Williams foundry, destroyed by fire last winter. The new building will be much larger than the old one.

The New York Air Brake Co. has purchased a site at Watertown, N. Y., and will build a new foundry. Details of plans are not announced, but it is understood that the new foundry will be a large one. The company already has an extensive plant at Watertown.

The Ross-Meehan Foundry Co., Chattanooga, Tenn., will soon erect an addition to its plant and put in some new machinery.

The Cleveland Twist Drill Co., Cleveland, will erect a new addition to its plant at a cost of $10,000. The new building will be three stories, 150x40 feet, of brick. It is not intended to establish a new department, but to provide more room for existing departments. The business of the company is growing rapidly. August is usually a rather dull month, but it was not with this company this year. The new building will be occupied by Jan. 1.

The Mannington Boiler & Machine Works, Mannington, W. Va., recently destroyed by fire, will be rebuilt at an early date.

Moore's Elevator Manufacturing Safety Brake Co. has been incorporated under the laws of South Dakota for the manufacture of safety brakes in Buffalo, N. Y. A factory will be erected and will employ 100 men. The officers are Buffalo men as follows: President, George M. Moore, Donald Y. Leslie, treasurer, and D. R. Cunningham, secretary.

The Brown-Ketcham Iron Works of Indianapolis, Ind., have purchased a site at Greensburg, Pa., and will build a plant. The Indianapolis plant will not be abandoned.

The Detroit Automatic Stoker Co., Detroit, Mich., is considering the erection of a new plant with about four times the capacity of the present works. At present about 100 strikers per year are turned out, but owing to the increased demand the erection of a much larger plant has been made a necessity.

The General Electric Co., Schenectady, N. Y., is preparing plans for the erection of an additional machine shop which will be much larger than present shop No. 16. An immense store house, 800 feet long and 135 feet wide will be erected shortly, while an extension to the wire and cable shop 300 feet long is under erection.

The Michelmann Boiler Co., Quincy, Ill., is erecting a new

boiler shop 100x107 feet in dimensions. Several pneumatic riveting machines, punches and shears will be contracted for shortly.

The Johnson & Jennings Co., Chicago, will build a new foundry 90x162 feet. An office will also be erected, adjoining the foundry.

J. P. McDonough, proprietor of the McDonough Iron Works of Galveston, Tex., has purchased a site 120x214 feet for the erecting of a structural fitting shop. Work on the erection of the new plant will be pushed vigorously so that operations can be commenced in about three months. Punches, shears and pneumatic riveting machines as well as a traveling crane will be purchased as part of the shop equipment.

Fires and Accidents —

The scrap warehouse of Housman & Wimmer, Fittsburg, was destroyed a few days ago; loss $8,000.

The plant of the Ohio Machine Tool Co., Kenton, O., was destroyed by fire Sept. 4. Loss, $100,000.

The machine shop of Henry W. Putnam, at Bennington, Vt., was damaged by fire a few days ago. Loss, $2,000, covered by insurance.

The plant of the Hartford Foundry Co., Hartford, Conn., employing 150 hands, was seriously damaged by fire Sept. 6. An electric wire is thought to have been responsible. About half the plant will be in operation again within two weeks.

The Summit City Machine Co., Akron, O., was damaged by fire last week to the extent of $4,000. The loss is covered by insurance.

General Industrial Notes:—

The Knott & Van Arnam Co. of Coldwater, Mich., which manufactures plumbers' specialties, will move its plant to Ft. Wayne, Ind.

The Cureton Foundry Co., of Mt. Vernon, O., has received an order from the Nordberg Mfg. Co., of Milwaukee, for castings for two 40,000,000 gallon pumps for the Illinois Steel Co.

The Reynolds & Chalou Foundry Co., Troy, N. Y., will soon remove to the plant formerly occupied by the Empire foundry. The buildings will be repaired and refitted.

The Port Huron Air Tool Co., Port Huron, Mich., recently filled an order from the Detroit Steel Casting Co. for five steel jib cranes, requiring 10 air motors.

The Nortmann-Duffke Foundry Co., of Milwaukee, will begin next week to turn out crucible steel castings in addition to the lines of work heretofore produced.

The main office of the American Steel Foundry Co., whose plant is located at Granite City, Ill., has been removed from the Wells Building in St. Louis, Mo., to Granite City. The foundry is being greatly enlarged at present and the melting capacity is to be materially increased by the addition of the recently acquired car plant adjoining the present property.

The rolling mill department of the Premier steel plant at Indianapolis, Ind., has been leased for a number of years by Chicago interests, represented by John D. Briggs of that place. The plant is to be placed in operation in about two months, although it has been idle for several years.

The Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has placed its seventh furnace in operation. The blowing in of this furnace will materially increase the company's output and will aid in catching up on back pig iron contracts.

The annual meeting of the stockholders of the Republic Iron & Steel Co. will be held on Oct. 15, at Jersey City, N. J.

The Williamson Furnace which was recently purchased by Frederick Dimmick, president of the Dimmick Pipe Co., in his recent purchase of the properties of the Williamson Iron Co., has decided to place the furnace in operation at an early date. The foundry and machine shop included in the property has been in operation for some time. The furnace has a daily capacity of 75 tons. It has been idle for the past two years.

We are advised that the Empire Iron & Steel Co., Niles, O., will commence operating its new plant about Oct. 1. The plant contains six hot stands of sheet rolls, two stands of cold rolls and a three-high 24-inch bar mill. Iron and steel sheets up to 60 inches in width will be manufactured, ranging in sizes from No. 16 to 30 gauge. A specialty will be made of double refined iron sheets, also range steel and polished sheets. The galvanizing department will be placed in operation about Jan. 1. The output of iron and steel angles will amount to about 100 tons daily, and for the present the largest size that will be rolled will be 4x4 inches.

The Leetonia Tool Co. has moved from Leetonia, O., to Salem, O., and will change the name to the Salem Tool Co. The capital has been increased from $3,000 to $10,000 and a large quantity of new machinery is being put in. A plant at Salem was rented and repaired. The company does not expect to build at present. It makes all kinds of miners' tools, its specialty being drilling machines.

The tube mill of the Youngstown Iron Sheet & Tube Co. is now being run double turn.

The Winget Machine Co., York, Pa., which was destroyed by fire Aug. 28, has rented a factory and ordered new machinery.

The Bodley Wagon Co. has moved from Staunton, Va., to Memphis, Tenn. The machinery moved filled 168 cars.

The Hammered Brass Co., of Cincinnati, has moved from Cincinnati to Anderson, Ind. The company employs 300 men.

The Pacific Light & Power Co., of Los Angeles, Cal., has decided to issue $10,000,000 in bonds to absorb the San Gabriel Electric Co. and make large additions and improvements, the details of which have not been made public.

The Northern Engineering Works, crane builders, of Detroit, Mich., have the contract for supplying the electric cranes for the new foundry of the American Ship Building Co., of Detroit, Mich. The contract consists of one 40-ton 5-motor and one 15-ton 5-motor electric traveling crane; one 3-ton electric crane and three 5-ton cranes.

The Columbus Forge & Iron Co., Columbus, O., has greatly increased its facilities for turning out general machinery forgings and shafts, as well as drop forgings. The company has made a good record for the quality of its products, which include heavy forgings, light forgings in multiples, solid wrought anvils, solid box vises and sucker rod joints. Wm. W. Franklin is president of the company; B. N. Huntington, vice president; Foster Copeland, treasurer, and David Buel, secretary and manager.

G. Mathes' Sons Rag Co., of St. Louis, dealer in scrap iron, machinery, metals, brass, rags and rubbers, has recently purchased the property at Broadway, Second and Branch Sts., covering an area 400x250 feet, and will carry on the scrap iron business on a large scale. The company has its own track facilities and is equipped to take care of all the business offered. Its offices and warehouse are at 3120-3130 North Broadway.

The American Supply & Construction Co., New York, has secured a contract from the United Fruit Co., of Boston, for the steam plant to be used for driving the electric lighting plant about to be erected at Port Limon, Costa Rica. The engines (three) will be furnished by the Harrisburg Foundry & Machine Works, of Harrisburg, Pa. The boilers will come from the Stirling Co., of Chicago, Ill. The condensers will be built by the Wheeler Condenser & Engineering Co., of New York. The heaters are to be of Wainwright type. The generators for the plant will be furnished by the General Electric Co.

The recent meeting of the Lake Superior Mining Institute at Duluth and on the Minnesota ranges gave all connected with iron mining interests in the upper peninsula of Michigan a demonstration of the convenience of the North Country Mail of the Duluth, South Shore & Atlantic Railway. On June 1, this year, the company put into commission two new trains, consisting of four cars each, which are designed to give to the north country all the comforts of travel available in the more densely populated sections of the country. One of these trains leaves Duluth at 6:45 each evening, bringing the traveler to Houghton and Calumet early the next morning and to Sault Ste. Marie or Mackinaw City by the middle of the forenoon. The other lands a passenger in Duluth early in the morning, with an over-night ride from Northern Michigan points, making a trip of 20 to 24 hours from the Central West or lower lake region to the head of Lake Superior. With the establishment of the North Country Mail the Duluth, South Shore & Atlantic inaugurated its own sleeping car system and put travel in the north country on a new basis of comfort, convenience and speedy transit.

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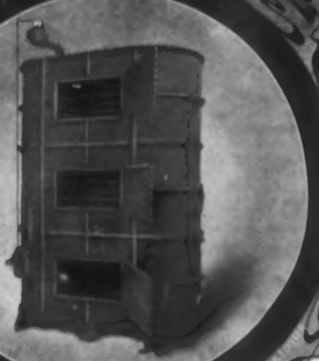

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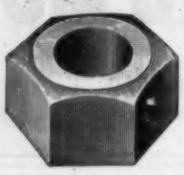
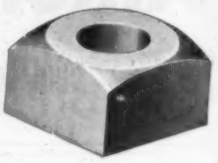
The Milton Manufacturing Co.,

MILTON, PA.



Manufacturers of **COLD PUNCHED NUTS**



HOT PRESSED NUTS, PLATE WASHERS, ETC.

Quality and Finish the Best. Send Specifications for Prices.

American Iron & Steel Mfg. Co.

General Offices at Lebanon, Pa., U. S. A.

MANUFACTURERS OF

Merchant Bar Iron and Steel

(Annual Capacity about 150,000 Tons)

Also Every Variety of

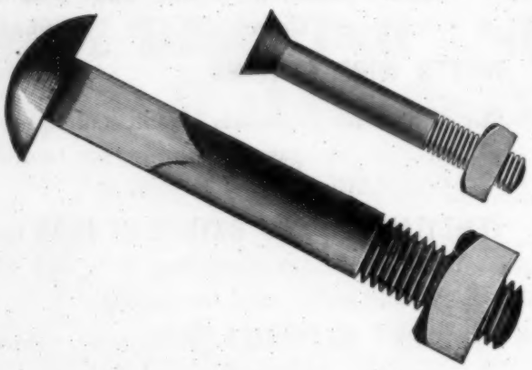
Machine Bolts, Nuts, Washers, Turnbuckles, Lag Screws, Railway and Dock Spikes, Harvey Grip and other Railway Track Bolts.

BOILER, SHIP AND STRUCTURAL RIVETS.

Car Forgings and Rods and Irons for Bridges, Buildings, Etc., Etc.

This Company owns and operates the works formerly owned by

J. H. STERNBERGH & SON, Reading, Pa. NATIONAL BOLT, NUT AND RIVET WORKS, Reading, Pa.
LEBANON IRON CO., Lebanon, Pa. EAST LEBANON IRON CO., Lebanon, Pa. PENNSYLVANIA BOLT AND NUT CO., Lebanon, Pa.



The Highest Grade

of fit and finish is attained in our Philadelphia Eagle Carriage and Tire Bolts.

THE UPSON NUT CO.,

CLEVELAND, OHIO.

When writing, refer to this advertisement.

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BAR IRON BAR STEEL

MACHINE BOLTS, CARRIAGE BOLTS, GIMLET POINT COACH SCREWS, TURNBUCKLES.

NUTS. R. R. SPIKES. PIG IRON.

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American Sheet Steel Company

Battery Park Building New York

Manufacturers of all varieties of

IRON AND STEEL SHEETS

Black and Galvanized
Plain and Painted
Flat, Corrugated and "V" Crimped

Apollo Best Bloom Galvanized Sheets
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S. J. Waterman, Union Trust Bldg., Cincinnati
Hoge & Swift, Portland, Oregon
F. A. Goodrich & Company, Majestic Bldg., Detroit.
Wm. B. Isaacs, 226 Market Street, San Francisco
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T. W. Simpers, Land Title Building, Philadelphia
F. C. Milliken, Vandergrift Building, Pittsburg
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WAUKESHA SHEET STEEL COMPANY, WAUKESHA, WIS.

Manufacturers of BLACK and GALVANIZED SHEETS, PLAIN and PAINTED, FLAT and CORRUGATED.

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Chicago Office, A. M. Castle & Co., 54 S. Canal St.
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Railroad, Marine and Machine. All Shapes. Heavy Shafting in the rough, rough turned or finished.

TRADE SABLE MARK.

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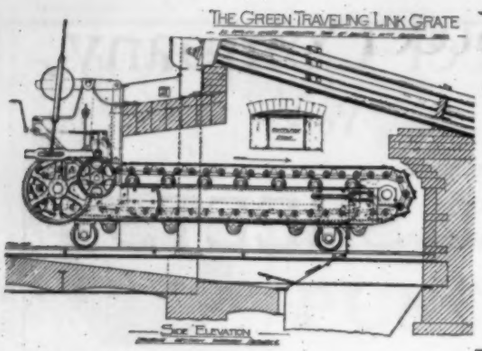
Best in the market for STAMPING and ELECTRIC WORK. BLACK and GALVANIZED. PLAIN and PAINTED. FLAT and CORRUGATED.

Specialty: Sable Brand Best Forging Iron. Zug & Co., Ltd., Pittsburg, Pa.



GREEN TRAVELING LINK CHAIN GRATE.

SMOKELESS COMBUSTION.
AUTOMATIC STOKER.

Get our Complete Catalogue.

GREEN ENGINEERING CO., . . Chicago, Ill.

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This refers to your advertising if you do it right. There are two things to be kept in mind, however, in connection with this statement.

ONE IS—

Say something in your advertising space, and say it just as though your customer was sitting opposite you and you were telling him about the merits and good qualities of your machinery or materials.

THE OTHER IS—

Put your advertisement in papers that you know are read by the aforesaid customer; that is, the man or buyer who represents the customer you want to sell to, which, in nearly every case, is the proprietor himself, or, in large firms, the buyer.

THE IRON TRADE REVIEW reaches the *proprietor* and *buyer*.

This (MF) trade mark is stamped on every sheet of the best roofing tin made. This (MF) mark means "Most Favored," because this brand is most favored by architects, dealers, and builders everywhere. MF Roofing Tin was first made in Wales 50 years ago—later the process was improved in America—and the product developed, until now MF Roofing Tin is more in demand than any other brand. The superior quality of MF Roofing Tin is attested by the first prize awarded it at the Paris Exposition, 1900, where it was in competition with all the world.

MF

The entire tinning process is effected by skilled hand labor, without the use of acids or rolls. The very best plates, the greatest amount of pure tin and new lead, the utmost care in manufacture, successively contribute to making MF the best of all roofing. It is most economical, because it lasts longest—many roofs made of MF 50 years ago are sound as ever today. MF Roofing Tin is sold by dealers everywhere. Specify it in your building estimates. Ask your roofer,

or write { W. C. CRONEMEYER, Agent, Carnegie Building, Pittsburg

and receive illustrated book on roofing.

AMERICAN TIN PLATE COMPANY, NEW YORK.

DOES IT PAY to use coated sheets in place of black?

IT DOES if you use the ALUMINUM COATED.

Some of our customers are using it as a substitute for copper.
It can be soldered with common solder.

The Steel & Iron Aluminum Coating Co., CONNELLSVILLE, PENN'A.

American Steel Hoop Company

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CHICAGO: The Rookery CINCINNATI: Union Trust Building CLEVELAND: Perry-Payne Building
DENVER: People's Bank Building DETROIT: Union Trust Building NEW YORK: Empire Building
PHILADELPHIA: Harrison Building SAN FRANCISCO: 258 Market Street
ST. LOUIS: Chemical Building ST. PAUL: Pioneer Press Building WASHINGTON: National Safe Deposit Building

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National Tube Company,

Manufacturers of

BLACK and GALVANIZED
Wrought Merchant Pipe, all kinds: sizes 1-8-inch to 30-inch, fitted in any manner desired.

BOILER TUBES,
Mild Steel and Charcoal Iron, for Stationary, Locomotive and Marine Work.

CASING, TUBING
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GAS AND OIL LINE PIPE.

CYLINDERS,
Lap-Welded and Seamless, tested from 100 to 3,700 lbs., for Compressed Air, Carbonic Acid Gas, Anhydrous Ammonia, etc., etc., etc.

WATER and GAS MAINS,
Converse and Matheson Lead Joint Pipe, 2-inch to 80-inch.

SEAMLESS
Tubes, Shrapnel, Projectiles and Miscellaneous Forgings.

GENERAL OFFICES:
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LOCAL SALES OFFICES:
Havemeyer Building, New York. Empire Building, Pittsburg.
Western Union Building, Chicago.
267 South 4th Street, Philadelphia. 420 California Street, San Francisco, Cal.

FOREIGN OFFICES:
Dock House, Billiter Street, London, E. C., Eng.

TELEGRAPHIC ADDRESS—TUBULIFORM, LONDON.

OTIS STEEL

"OTIS" FIRE BOX PLATES A SPECIALTY.
Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

Head Office and Works, CLEVELAND, OHIO.

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WASHINGTON, Kellogg Building.
MONTREAL, Homer Taylor, 183 St. James St.
SAN FRANCISCO, John Woodlock, 154-156 First St.

Newark Iron & Steel Co., NEWARK, OHIO.

Open Hearth Steel Castings, Forge Steel, High Pressure and

LONG DISTANCE 'PHONE **358.**
Orders Solicited. Promptness and Reasonable Prices Our Motto.

Hydraulic Fittings, Oil Well Specialties, Castings Made True to Pattern and Uniform.

Figure it up.

Suppose you should write a letter once a week to every firm in the country, who might be a customer of yours, telling them about your material, and asking them to give you an order. Have you ever estimated what it would cost you to do this, allowing for postage, letter heads, envelopes and stenographer? Just do this once and then compare this with the cost of a space in THE IRON TRADE REVIEW once a week for a year sufficiently large to say all you would say in your letter. It will surprise you.

THE IRON TRADE REVIEW is read by BUYERS in all lines of the metal working trades.

Better send for rates.

THE IRON TRADE REVIEW,
CLEVELAND, O.

HEADQUARTERS FOR REFRACTORY LININGS FOR BASIC O. H. FURNACES.

CHROME ORE, Blackwell's Special Refractory Quality.
CHROME BRICKS, } THE "Matchless Brand."
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MAGNESITE CALCINED, Lump and Ground, and Cement.

FERRO-PHOSPHORUS, Lion Brand, Increases Heat, Enriches Slag.
CALCIUM FLUORIDE (Fluor Spar) THE Desulphurizer.
Geo. G. Blackwell, Sons & Co., Limited, The Albany, Liverpool, Eng.
MANUFACTURERS, METALLURGISTS, MINE OWNERS, MERCHANTS.
WORKS: Garston Docks CODES: A. B. C., Moreing & Neal, Leibers, and Western Union.

THE BASSETT-PRESLEY COMPANY,
IRON & STEEL.
CLEVELAND, OHIO.
Try our celebrated CROWN IRON—3-8 in. to 2 in. carried in stock.

THE UNITED COKE & GAS COMPANY,
277 BROADWAY, N. Y.

COMPLETE COKE AND GAS PLANTS INSTALLED.

SPECIALTIES: Coke Ovens with and without Saving of By-Products.

BY-PRODUCT OVENS NOW IN COURSE OF ERECTION:

Lackawanna Iron and Steel Co	Lebanon, Pa.	232 Ovens.
Lackawanna Iron and Steel Co	Buffalo, N. Y	564 "
South Jersey Gas, Electric and Traction Co.	Camden, N. J.	100 "
Maryland Steel Co.	Sparrow's Point, Md.	200 "
Michigan Alkali Co	Wyandotte, Mich.	15 "
Sharon Coke Co.	Sharon, Pa.	212 "

TROPENAS STEEL PROCESS

With one 2-Ton Converter, makes Castings from 1 oz. to 10,000 lbs.

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AVERAGE OF 22 TESTS MADE BY U. S. GOVERNMENT.

Sulphur .035%. Ph. .060%.
Elastic Limit 34374. Tens. Strength 67722.
Elongation 33, 36%. Reduct. of Area 46, 4%.
Bent Cold 186 Degrees as Above.

11 PLANTS IN U. S. AND CANADA.

American Malleable Iron Co.

Marquette Building, Chicago.

CAPACITY: 20,000 Tons Annually.

PROMPT DELIVERIES.

WORKS: Chicago Highlands, Ill.

High Grade Malleable Castings of all kinds.

Strictly Chemically Pure Acids and Aqua Ammonia,

ESPECIALLY ADAPTED TO LABORATORY WORK.

MANUFACTURED BY

THE GRASSELLI CHEMICAL COMPANY,

General Office and Principal Works, CLEVELAND, O., U. S. A.

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Beaver Falls, Pa. East Chicago, Ind. Birmingham, Ala.
Philadelphia, Pa.: Wm. M. Wilson's Sons, 225 Dock Street.
New Orleans, La.: The Grasselli Chemical Co., Godchaux Bldg.
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For All Possible Purposes.
Made as they should be.

CRAWSHAW & JUDD,

51 UNION STREET,

WORCESTER, MASS.

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Chemist, Assayer and Metallurgist.

Analysis made of ores, minerals metals, fuel, water and foundry supplies.
Ores sampled at mine, dock and furnace. Examinations made of mineral lands. 158 Superior St., Cleveland, O.

BESSEMER COKE COMPANY,

Manufacturers of

CONNELLSVILLE COKE,

Furnace, Foundry and Crushed Coke.

Mines and ovens in Connellsville region.

Direct connections with all the railroads entering the region.

OFFICES: LEWIS BLOCK, PITTSBURGH, PA.

CAPACITY, 75 CARS DAILY. INDIVIDUAL CARS.

H. C. FRICK COKE CO.,

Post Office

PITTSBURG, PA.

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Connellsville Coke Only.

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"FRICK COKE"

For Blast Furnaces and Foundries; also crushed Connellsville Coke (substitute for Anthracite Coal) for manufacturing and domestic purposes.

13,500 OVENS.

Daily Capacity 30,000 tons of Coke.

Mines and Ovens in the Connellsville Coke Region, Pennsylvania.

Direct connection with all the railroads entering the region.

Quotations, Freight Rates, Pamphlets giving full information promptly furnished on application.

BRASS FOUNDERS FINISHERS J. J. RYAN & CO.,

68-74 West Monroe St., CHICAGO.

Best Bronze, Babbitt Metals, Brass and Aluminum. CASTINGS ON SHORT NOTICE.

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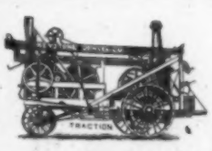
ENTIRE OUTFITS for WASHING and DRESSING ORES and PHOSPHATES at Least Cost.

Improved Washers with steel or wood logs. Screens, cylindrical and conical of all descriptions. Steel slow moving elevators and conveyors. Picking Belts for coarse material and hard usage. Friction Hoists. Single Roll Crushers for rough crushing in large quantities.

CASTINGS of every DESCRIPTION. ESPECIALLY HEAVY ONES.



FOR TESTING IRON ORE BODIES

or drilling deep test holes in ANY formation—gravel, boulders and rock. Drives 4, 6, 8 or 10-inch pipe, and drills holes that size in rock, and **Produces at the Surface Everything Found.**

Tests for gold, lead, zinc, coal—everything. Can be used on boat, to explore river beds to bed rock. Water no hindrance. Drills water and oil wells quickly, cheaply and without skilled labor. Self-moving; complete. Write for full information and catalogue.

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HIGH GRADE FIRE BRICK

THE PORTSMOUTH & KENTUCKY FIRE BRICK CO. PORTSMOUTH OHIO

BEST BLAST FURNACE & STEEL WORKS BRICK

The Blakeslee Jet Pump

is always ready to do your pumping as long as you have steam at your command. It will pump sandy and impure water which other pumps cannot handle. There being no valves on the **Blakeslee Jet Pump,** there is nothing to wear out nor anything to get out of order. Coupled with reliability under all conditions the **Blakeslee** shows exceptional economy.

Ask us to mail you further particulars.

BLAKESLEE MFG. CO., Du Quoin, Ill.

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SET, CAP and MACHINE

Hexagon Nuts, Studs, Etc. **SCREWS.** Coupling Bolts Specials.

No. 2 N. Canal St., - - CHICAGO.

Who Builds the best Mine Pump?

Prescott.

Fred. M. Prescott Steam Pump Co., Milwaukee, Wis.

"THE NUT THAT STAYS"

The Elastic Self-Locking Steel Nut

It goes on the bolt with a slight grip that holds it from ever working loose like the ordinary nut, and requires no nut-lock or other fastening to hold it. For use on Cars, Track, Bridges, Machinery, etc., where nuts must stay it is greatly superior to the common iron nut and costs less. Our Elastic Nut Track Bolt makes the best and cheapest rail fastening. Write us for booklet, samples and prices on Sq. and Hex. Nuts, Machine Bolts, Track Bolts, Structural Rivets, etc. Address

NATIONAL ELASTIC NUT CO., Milwaukee, Wis.

PERFORATED PLATE SCREENS

AS REQUIRED FOR

Stone, Ore, Zinc, Lead, and all Railroad and Mining Uses.

SPECIAL SCREENS FOR COAL AND COKE.

HENDRICK MFG. CO.,

Samples and information upon request. Carbondale, Pa.

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CLEVELAND, O.

Allis-Chalmers Co.,

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Perforated Plates

for Incline Shaking and Revolving Screens for Coal Washing and Cleaning, and all other purposes.

Write for Prices.

The magnificent through train service maintained by the

"Big Four"

includes Buffet-Parlor, Cafe-Library, Dining and Observation Cars, and Pullman Sleepers. Reduced rate tickets are now on sale to

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Homestead Hotel

Has just been opened. Is now fire-proof. Has been entirely rebuilt of brick, stone and iron.

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Warren J. Lynch, Gen'l Pass. & Tkt. Agt.

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ESTABLISHED 1855

The "ORIGINAL CANDY"

STITCHED COTTON DUCK BELTING.

Especially adapted for Main Drivers, Saw Mills, Cotton Gins, Cotton Presses, and for all places where belts are subjected to moisture or atmospheric changes, the "GANDY" stands paramount.

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